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ABSTRACT

The articles in this monograph reflect the findings of a national survey that assessed the condition and needs of elementary school playground equipment. The following articles are presented: (1) "The Committee on Play and Its Mission" (D. Thompson); (2) "The National Survey of Elementary School Playground Equipment" (L. Bowers); (3) "Results of the Survey" (L. Bowers and L. Bruya); (4) "Location, Accessibility, and Equipment on Playgrounds" (S. Wortham); (5) "Slides, Swings and Climbing Equipment" (D. Thompson); (6) "Rotating, Spring Rocking, and See Saw Equipment" (S. Langendorfer); (7) "Sand Area, Wading Area, Signs, Trees & Pathways" (L. Bruya); (8) "Twenty-one Conclusions: Seventeen Safety Problems" (L. Bowers and L. Bruya); (9) "Our Nation's Playgrounds: In Need of Help" (D. Thompson); (10) "Teacher Preparation: Guidelines for Safe Play" (P. Lowe); (11) "Development Neglected on Hand-Me-Down Playgrounds" (S. Wortham); (12) "Negligence: Safety from Falls Overlooked" (J. Beckwith); and (13) "The New Challenge: Playground Upgrades" (L. Bruya). The following appendices are included: (1) Mission Statement for the Committee on Play; (2) National Elementary School Playground Equipment Survey; (3) Trained Volunteer Survey Administrators; (4) Playground selection process; and (5) The Playground Assessment (PEA) revised instrument. (JD)

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Volume I

Where Our Children PLAY

Elementary School Playground Equipment

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A Project of the
American Association for Leisure and Recreation
An Association of the
American Alliance for Health, Physical Education, Recreation, and Dance

WHERE OUR CHILDREN PLAY

Elementary School Playground Equipment

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A project of the

American Alliance For Health, Physical Education, Recreation and Dance
American Association for Leisure and Recreation
Committee On Play

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About the Alliance

The American Alliance for Health, Physical Education, Recreation, and Dance is an educational organization, structured for the purposes of supporting, encouraging, and providing assistance to member groups and their personnel throughout the nation as they seek to initiate, develop, and conduct programs in health, leisure, and movement-related activities for the enrichment of human life.

Alliance objectives included:

1. Professional Growth and development- to support, encourage, and provide guidance in the development and conduct of programs in health, leisure, and movement-related activities which are based on the needs, interests, and inherent capacities of the individual in today's society.
2. Communication- to facilitate public and professional understanding and appreciation of the importance and value of health, leisure, and movement-related activities as they contribute toward human well-being.
3. Research- to encourage and facilitate research which will enrich the depth and scope of health, leisure, and movement-related activities; and to disseminate the findings to the profession and other interested and concerned publics.
4. Standards and guidelines- to further the continuous development and evaluation of standards within the profession for personnel and programs in health, leisure, and movement-related activities.
5. Public affairs- to coordinate and administer a planned program of professional, public, and governmental relations that will improve education in areas of health, leisure, and movement-related activites.
6. To conduct such other activities as shall be approved by the Board of Governors and the Alliance Assembly, provided that the Alliance shall not engage in any activity which would be inconsistent with the status of an educational and charitable organization as defined in Section 501(c)(3) of the Internal Revenue Code of 1954 or any successor provision thereto, and none of the said purposes shall at any time be deemed or construed to be purposes other than the public benefits purposes and objectives consistent with such education and charitable status.

Bylaws, Article III

FOREWORD

The Committee on Play

The group of professionals which eventually made up the Committee On Play was organized following a call from the AAHPERD — AALR in 1983. At that time only a few were able to respond. One of these, Edsel Buchanan, eventually assumed the leadership of the committee. Throughout the loosely knit and consortial organization of the committee, he and Barbara Sampson shared their vision with a group of professionals dedicated to advocating for children and their right to play. In addition, Donna Selina of the International Association for The Child's Right to Play (I.P.A.) was instrumental in formalizing the consortial effort with Associations outside of AALR/AAHPERD.

Through out the development of a mission statement, goals and finally specific objectives, the committee membership dwelled on the need to make a significant contribution to the literature and in the process serve children by advocating for their rights. To this end energy and creative thought was directed. Finally, the national survey project was undertaken.

The National Survey of Elementary School Playgrounds

To begin, the committee realized that what was needed was concrete evidence on the status of elementary school playgrounds. All considerations and eventual goals for this consortial group revolved around understanding better what the state of the currently available playground was across the nation. And yet no information on this topic was available in the literature. Thus, the committee undertook the lengthy process of determining the state of elementary school playgrounds.

This volume is a reflection of that effort. Nine professionals have made contributions to this report. Through hours of preparation and labor the project and this volume began to take shape. Through two critical reviews and rewrites this volume was woven together in the attempt to present a single view of elementary school playgrounds written from the combined expertise of professionals from differing backgrounds, preparations and geographic locations. Always, the single intent was to provide information that could be used to advocate for children and their play.

The reader will find between the covers, the most complete assessment of elementary school playgrounds ever undertaken. The purpose of these materials is to provide information for readers as they undertake their own process of advocacy. Through observation of survey results, the play environments provided by the schools for children can be considered, and action taken to better meet the developmental needs of our children.

The Review System

Those participating in the preparation of this volume realized from the outset that a review process would be needed to insure the quality of the information within this volume. In addition, the committee realized that a single volume which would feel cohesive and to some extent uniform must be submitted to a reviewing process. Thus, reviewers were selected from professionals involved with children, professionals involved in design and professionals outside the process of this survey. The following includes all those who participated in the review process:

• Jay Beckwith; Playground Designer •
• Joe Frost; Early Childhood •
• Curt Fowler; Elementary School Teacher •
• Sharyl Green; Landscape Architect •
• Allen Jackson; Statistician •
• Patty Lowe; Elementary School Teacher •
• Barbara Sampson; Recreation and Leisure •
• David Sommerfeld; Elementary School Administrator •
• Donna Thompson; Elementary Physical Education •
• Eileen Warrell; Elementary Physical Education •
• Sue Wortham; Early Childhood •

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WHERE OUR CHILDREN PLAY

Elementary School Playground Equipment

PART ONE:

THE COMMITTEE ON PLAY

CHAPTER 1

THE AALR COMMITTEE ON PLAY AND ITS MISSION

by

Donna Thompson
University of Northern Iowa

According to the bylaws of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) — American Association of Leisure and Recreation (AALR) Committee on Play (COP) Operating Code, the Committee on Play has three purposes. They include:

1. Developing of a consortial advocacy group regarding play;
2. Collecting, selecting, and distributing resource materials on play;
3. Emphasizing the conduct and distribution of research concerning play.

This document fulfills these purposes.

The National Survey of Elementary School Playgrounds project was truly a consortial effort. The American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD), with its subsidiary organization AALR-COP, joined other organizations outside AAHPERD to complete the task. The International Association for the

Child's Right to Play (IPA) and the Association for Childhood Education International (ACEI) were two of those groups.

Beyond that, this is the first concerted effort to collect and distribute information on play and playgrounds. The COP targeted a study of this magnitude as a seminal effort to collect and distribute a national report which would draw attention to the importance of play. It is through this report that the COP intends to begin advocating the improvement of environments for children.

Establishing the Committee on Play

The operating code for COP was approved in 1984 by the AALR board of Directors. That decision was a result of three years of work begun at the Boston AAHPERD Convention in 1981 by a handful of interested professionals. Since that time a mission statement has been adopted and is listed in Appendix 1A (see Table 1.1 for an abbreviated version).

Table 1.1 The AAHPERD—AALR-COP mission statement was approved by concensus of the COP constituency in 1983.

COP Mission Statement

The committee shall:

- investigate the role of play in American society and human culture
- work to understand the role of play in the physiological and psychological development of individuals
- determine the environmental conditions which support play
- distribute information about play
- advocate for the rights of children to play

The COP pledged its efforts to accomplish goals emanating from its stated mission. These goals dealt with 1) the role of play 2) the developmental ramifications of play 3) the environmental conditions of play and 4) the communication of information about advocacy for play. They can be found listed in detail in Appendix 1B and briefly in Table 1.2.

Table 1.2 The AAHPERD—AALR-COP goal statements were accepted in 1983 by the constituency of the committee on play.

Goal Statements for COP

Role of Play
1. in development and learning
2. as a social force
3. as a therapeutic tool

Ramifications of Play
1. processing and organizing information
2. improving affective, cognitive, and psychomotor functioning

Environmental Conditions Supporting Play
1. evaluating playgrounds and suggesting improvements
2. determining design criteria for playgrounds
3. determining function and purpose of play equipment
4. determine the use of durable, economical, and safe materials

Communication and Advocacy for Play
1. producing, distributing and presenting information on play
2. actively promoting play

Objectives were developed for each goal statement. It was the intent of the Committee on Play that the objectives be measurable.

That is, each objective was designed to produce materials that could be be used by its' constituency.

It should be noted that the publication of this report accomplishes the objectives prepared for the goal statement: to study and produce materials related to environmental conditions which support play for children. This means that the plan to assess play settings, in this case elementary school playgrounds, is at least partially realized in the development of the assessment instrument and the conduct of an evaluation of playgrounds across the nation. In addition, the purpose which states that the COP will collect, select and distribute resource materials and research on play, is also partially met with the publication of this manuscript.

Consortial Effort

The Committee on Play is committed to the premise that play is a multifaceted phenomenon which is the possession of no single organization or person, but rather of humanity as a whole. Play should be studied by many disciplines working together to interpret meanings from broad based and shared information. In this manner, play can be understood more fully and the environments in which children play can be developed more appropriately. Thus, consortial effort is sought by the Committee on Play.

COP, in an official capacity has sponsored events with the International Association for the Child's Right to Play (IPA-USA). The committee also is represented within the Association for Childhood International and maintains a close working relationship with that organization.

Efforts are being made to obtain representation from and with the National Parks and Recreation Association (NRPA), with PLAE for All, with the Environmental Design and Research Association, with the arts, and with businesses interested in the play of children. COP also seeks representation from other groups or organizations that are interested in studying play.

The Survey

The COP established criteria which governed the conduct of the National Survey of Elementary School Playgrounds. These included 1) ensuring the readability of a manuscript which might result from such a project 2) defining the populations which will most likely use the information collected and 3) determining the potential practical applications which might be made from the information by these populations. The following sections of this chapter will be used to consider each of these criteria.

Readability. Because of the wide scope and educational background of the populations interested in a survey of this type, the report in its present form, has been reviewed by several levels of readers to ensure that it is understandable and of practical merit. The intention of the committee is to insure that this document can be used. Consequently, care has been taken to see that several potential levels of interpretation and use exist for the information reported (we wish to express appreciation to the contributing authors for their flexibility in the adaptation of their manuscripts).

Interested Populations. The people most interested in the results of this survey belong to two overlapping but different populations. The first of these is the child caregiver population, which includes recreation specialists, teachers (both physical education and classroom), parents (PTA's), school boards, park and school administrators, and custodial and maintenance crews for parks and schools (see Figure 1.1).

The other population that is likely to be interested in the results of this survey is the population which includes producers and manufacturers of products and services to the caregivers (see Figure 1.1). This population includes landscape architects, playground designers, researchers and businesses which manufacture playground equipment.

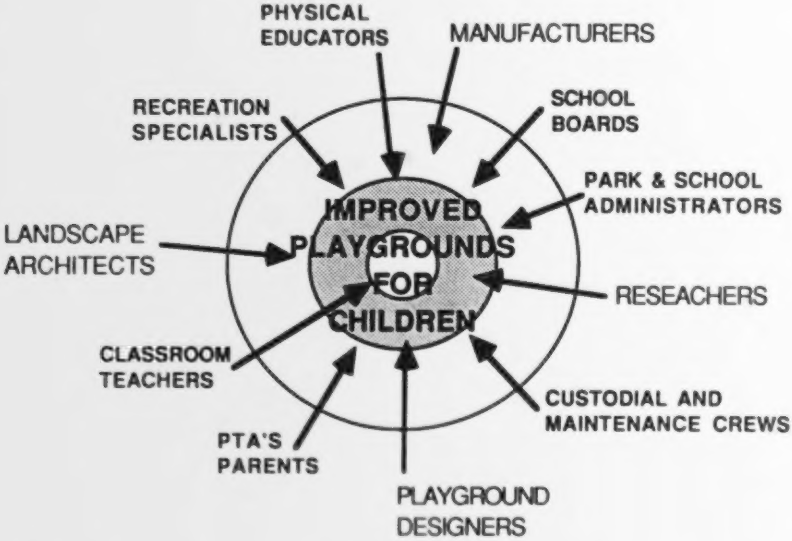


Figure 1.1 The population most likely to use the results of the survey include those interested in the welfare of children from several professions.

Practical Applications. These populations and subgroups will use the results of this survey in different ways. Physical education teachers and recreation play leaders are potential users of playground equipment. Both groups supervise the use of playground equipment and suggest appropriate equipment for purchase. Classroom teachers and PTA's are also likely to be interested in this survey since they frequently purchase equipment for elementary school playgrounds. School boards and park and school administrators must also consider the potential liability associated with the purchase and supervision of playground equipment.

Strong inferences are provided regarding the safety of various pieces of equipment. Guidelines for safety and an instrument to gather information for such evaluation are included. Construction and/or design detail can be gleaned from the data since breakage, sharp edges and protrusions are also considered.

The development of the child is discussed in relationship to existing pieces of equipment. Moreover, researchers and academicians will find a gold mine of information since it is relatively easy to draw significant relationships, implications, and discussion from data that is provided.

COP encourages all of these applications since it is through application that the environments for children will improve. And this is the real purpose for this report and for the Committee On Play.

PART TWO:

ELEMENTARY SCHOOL PLAYGROUNDS

CHAPTER 2

THE NATIONAL SURVEY OF ELEMENTARY SCHOOL PLAYGROUND EQUIPMENT

by

Louis Bowers
University of South Florida

The National Survey of Elementary School Playground Equipment was undertaken because of concern with the limited developmental play activities provided by traditional playground equipment and the number of emergency room type accidents which occur each year on playground equipment (see figure 2.1). It was the intent of the Committee On Play to gather data which would provide objective information that could be used to improve existing and future playgrounds for children.

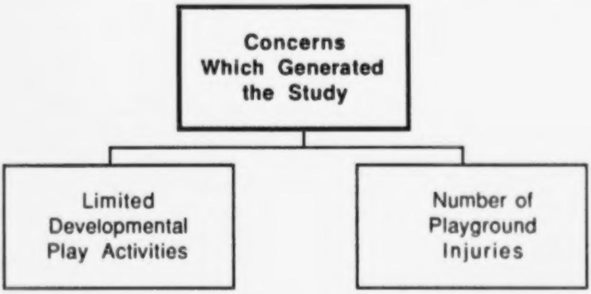

Concerns Which Generated the Study
Limited Developmental Play Activities
Number of Playground Injuries

Figure 2.1 The concerns of the COP membership which generated the emphasis to conduct the study were twofold and are shown here.

Survey Instrument Development

The first step was to develop a playground survey instrument. This was formulated by Louis Bowers after reviewing several existing playground survey instruments provided by members of the COP Committee, and after extensive study of playground equipment related accidents reported through the National Electronic Injury Surveillance System (NEISS).

Dr. Bowers initial attempt at formulating the survey instrument was reviewed by COP members, Dr. Donna Thompson, Dr. Joe Frost, Dr. Lawrence Bruya, Dr. Sue Wortham, Ms. Donna Seline, and Mr. Jay Beckwith. This group of nationally recognized experts who are active in contributing to the professional journals concerned with playgrounds and in related professional organizations was able to provide a wide range of views related to the appropriateness of the survey instrument items, as well as the clarity and validity of each.

Field trials were conducted at the University of South Florida by fifty undergraduate physical education majors trained to conduct survey on elementary school playgrounds in the Tampa, Florida area. Students returned completed surveys and in written form reported any difficulties in the interpretation of individual items on the survey to Bowers. Dr. Bowers then used their comments to again rewrite and clarify selected items on the survey. The process of constructing the survey instrument, reviewing the instrument by the panel of experts, rewriting the instrument, conducting field trials, and finally to again revise the survey instrument took place between May 1984 and April 1985 (see figure 2.2). Following this procedure the instrument assumed the name of the *AAHPERD-AALR-COP. National Elementary School Playground Equipment Survey*

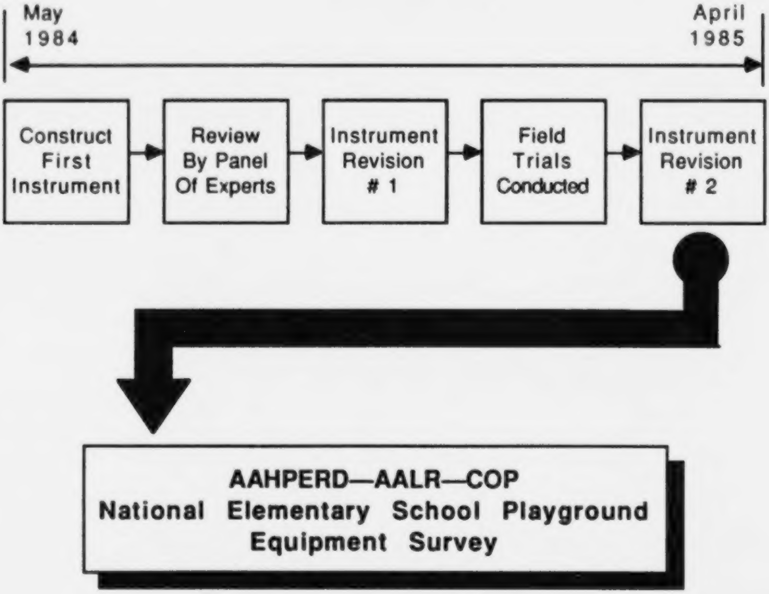

May 1984
April 1985
Construct First Instrument
Review By Panel Of Experts
Instrument Revision # 1
Field Trials Conducted
Instrument Revision # 2
AAHPERD—AALR—COP
National Elementary School Playground Equipment Survey

Figure 2.2 The process of developing the National Elementary School Playground Equipment Survey instrument was completed by Bowers in 11 months.

AAHPERD—AALR—COP National Elementary School Playground Equipment Survey

Specifically, the six page survey instrument was designed to provide information regarding 1) the type and number of play structures 2) the location of each structure relative to other equipment 3) the state of maintenance of each piece of equipment 4) the height and configuration of the equipment and 5) the type of surface material found under each piece of equipment (see figure 2.3). The survey further focused upon characteristics such as broken parts, sharp edges, projections , and other safety conditions.

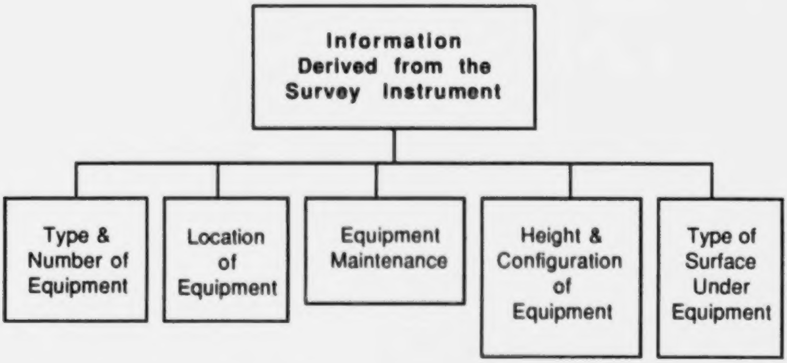

Information Derived from the Survey Instrument
Type & Number of Equipment
Location of Equipment
Equipment Maintenance
Height & Configuration of Equipment
Type of Surface Under Equipment

Figure 2.3 The survey instrument was designed to provide information in five important areas.

The survey instrument used in conducting the study consisted of 12 sections with no less than 4 or more than 10 items in each section. There were a total of 100 items to be considered in completing each assessment using the National Elementary School Playground Equipment Survey.

Sixty-three of the items called for a yes (√) or no (X) response, whereas thirty-seven items required a numbered or quantitative response. The items were constructed to allow objective reporting of the type, size, location, or condition of the equipment while eliminating the need for the surveyor to make judgments concerning the safe or unsafe state of the equipment. Data on individual pieces of playground equipment which is reported later in this document is based on the observation of 1,983 playground equipment structures. These were grouped into categories which were used to identify 944 climbing structures, 403 swing structures, 300 slide structures, 183 seesaws, 44 rotating structures, 41 designated sand play areas, 33 rocking structures, and 32 designated wading pools.

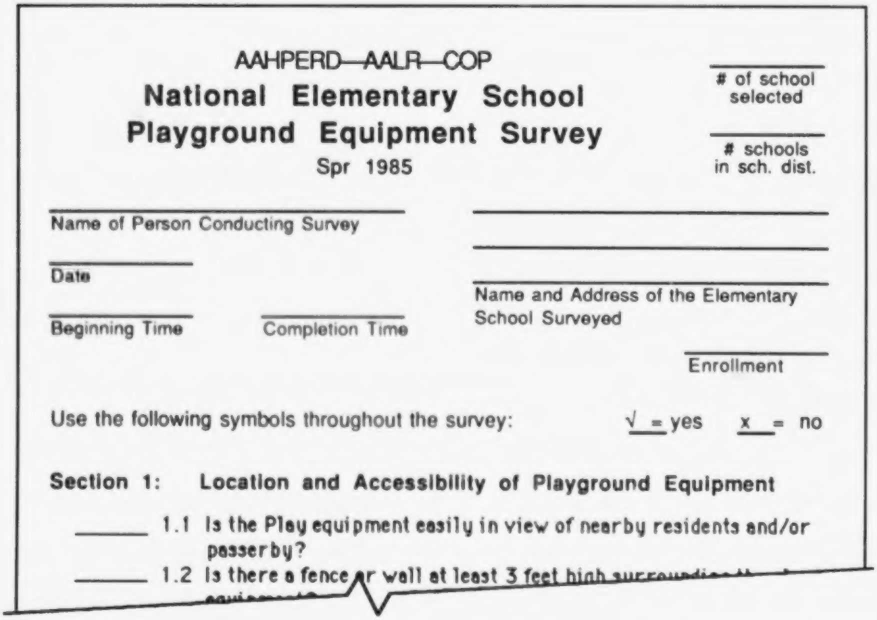
Assessment categories for swing structures, sliding, climbing, rotating, and spring rocking equipment, sand play areas, wading pools, signs, trees, and pathways were surveyed separately. Consequently, although several structures of a particular category of equipment might be present on a playground, if a broken part or sharp edge was detected on any piece of equipment within a category, it was reported as existing in that category of equipment. This reporting procedure was selected since it was felt that a single poorly constructed or maintained piece of equipment in any one category of equipment was available for use by the children during their play time and thus constituted a problem within that category of equipment.

The survey instrument was designed to be used to assess the equipment on the playground while no children were present to play on it. In this way the players would not distract the surveyor's focus on the equipment or their objectivity regarding the status of the equipment. However, the use of this approach eliminated the inclusion of questions related to the relative use of different equipment by players or the way in which children play on different pieces of equipment.

The survey instrument was designed to eliminate judgments by the surveyor regarding the safe or unsafe design or subjective evaluation concerning the condition of the equipment. Many of the items in the survey provide information which will allow the Committee On Play membership, and eventually others who select to use the published findings, to compare the results of the study with local standards for playground equipment or to compare the results to the guidelines for playground equipment recommended by the Consumer Products Safety Commission (CPSC, 1978a; CPSC, 1978b; CPSC, 1979; CPSC, 1982a; CPSC, 1982b) . In essence, it is intended that this study, and the instrument which was generated during the study, be used to encourage future assessments of this nature, as well as act as a springboard for determining needed improvements in playground equipment.

The survey instrument generated as a part of the study was designed to be easily administered within a 30 minute period. The average time required to administer the instument by the 34 trained volunteers that eventually administered surveys, was 24 minutes. An example part of the survey used to collect data for the National Survey of Elementary School Playground Equipment Project is seen in Figure 2.4.

The Committee On Play advertised through a number of professional journals and by means of direct mailing to AAHPERD members, requesting volunteers who would participate in the study by conducting surveys of randomly selected elementary school playgrounds located within their geographical area. To participate, volunteers received training in the administration of the survey at a pre-convention workshop which was held as a part of the 1985 AAHPERD National Convention in Atlanta.



AAHPERD—AALR—COP

National Elementary School Playground Equipment Survey

Spr 1985

______ # of school selected

______ # schools in sch. dist.

______ Name of Person Conducting Survey

______ Date

______ Beginning Time

______ Completion Time

______ Name and Address of the Elementary School Surveyed

______ Enrollment

Use the following symbols throughout the survey: √ = yes x = no

Section 1: Location and Accessibility of Playground Equipment

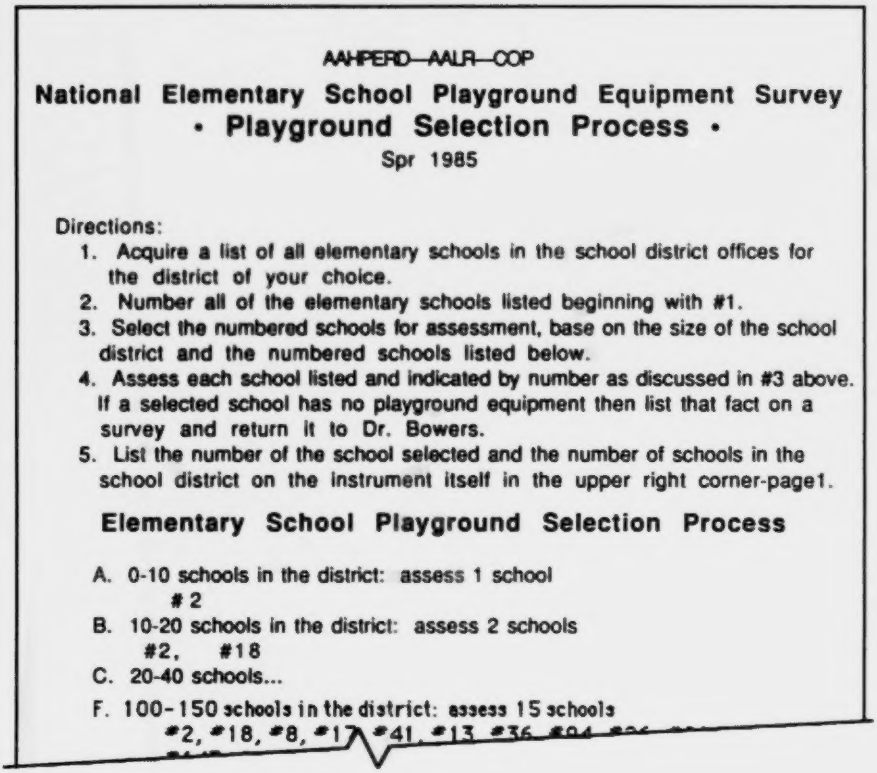
______ 1.1 Is the Play equipment easily in view of nearby residents and/or passerby?

______ 1.2 Is there a fence or wall at least 3 feet high

Figure 2.4 Part of page one of the National Elementary School Playground Equipment Survey—Spr1985 is shown. The entire instrument used to complete an assessment is found in Appendix 2A.

Survey Administrators Training Process

Forty-four volunteers from 36 states completed training in the administration of the National Elementary School Playground Equipment Survey on April 17, 1985 (see Appendix 2B). Volunteers participated in a two hour training session designed to teach them how to administer the survey. The session included a 35mm slide presentation of examples of assessment items followed by questions from the volunteers.



AAHPERD—AALR—COP

National Elementary School Playground Equipment Survey

• Playground Selection Process •

Spr 1985

Directions:

1. Acquire a list of all elementary schools in the school district offices for the district of your choice.
2. Number all of the elementary schools listed beginning with #1.
3. Select the numbered schools for assessment, base on the size of the school district and the numbered schools listed below.
4. Assess each school listed and indicated by number as discussed in #3 above. If a selected school has no playground equipment then list that fact on a survey and return it to Dr. Bowers.
5. List the number of the school selected and the number of schools in the school district on the instrument itself in the upper right corner-page1.

Elementary School Playground Selection Process

A. 0-10 schools in the district: assess 1 school
#2

B. 10-20 schools in the district: assess 2 schools
#2, #18

C. 20-40 schools...

F. 100-150 schools in the district: assess 15 schools
#2, #18, #8, #17, #41, #13, #36, #94

Figure 2.5 The 'Playground Selection Process' for the National Elementary School Playground Equipment Survey followed the procedure noted and the listed random numbers shown in this example. A more complete form of this procedure can be found in Appendix 2C.

The volunteers also were instructed in the procedure used to randomly select schools in their local school district for assessment. This procedure called for them to obtain a list of elementary schools in their district and then to randomly select on the average of one of ten elementary schools using a table of random numbers generated by the 'Playground Selection Process' which they were provided during training (see Figure 2.5).

Volunteers were further instructed to send all completed surveys to Bowers of the Department of Physical Education at the University of South Florida in Tampa, Florida.

The volunteers were then transported by bus to Candler Park, in Atlanta, where each participant independently used the instrument to survey the play equipment in the park. One limitation of this procedure was that Candler Park Playground is not an elementary school playground and did not have all of the equipment included as a part of the survey. It also was necessary for volunteers to share in the use of a limited number of measuring tapes for those items calling for measurement of the equipment. Upon completion, each volunteer returned their completed Candler Park Playground survey for tabulation of agreement between surveyors. A group discussion of the administration of the survey instrument was conducted on the return bus ride to the Convention Center in order to establish common procedures for any survey items not clearly understood by the volunteer surveyors.

Inter—rater Objectivity: Percentage of Exact Agreement

The independent surveys of the Candler Park playground equipment by 44 trained volunteers were used to obtain inter-rater exact agreement percentages (Roberton, 1977; Roberton, 1978; Williams, 1980) to establish the objectivity for qualitative questions in the survey when administered by trained volunteers. Exact agreement percentages were calculated for each item and each section within the instrument (Reid and Bruya, 1983). To complete this procedure the most frequent response in each category was devided by the total number of respondents and multiplied by 100.

Table 2.1 Inter-rater exact agreement percentage for section 1 & 2 as a whole and each of their items listed individually: from the National Elementary School Playground Equipment Survey, Candler Park assessment.

INTER—RATER EXACT AGREEMENT; SECTION 1 & 2

• Section 1 Agreement Percentage (Location and Accessibility of Equipment)	90.8%
• Section 2 Agreement Percentage (Placement and Size of Equipment)	69.8%

Item No.	Percentage
1.1 easy view	86.0
1.2 fence or wall	97.7
1.3 access	79.5
1.4 wheelchairs on equipment	97.7
2.1 ten feet between equipment	70.5
2.2 traffic patterns on pathways	55.8
2.3 smaller sized equipment	88.4
2.4 smaller-larger equipment separated	61.9

For example, if thirty-eight surveyors checked yes on the item and there were forty-four total respondents, then the inter-rater agreement was 86% (see Table 2.1, item 1.1). For survey items requiring quantitative responses of 'how many...' or 'how high...' the percentage of responses which were alike was computed (see Table 2.2).

The percentage of exact agreement among the forty-four trained volunteers also was computed for the survey as a whole. The over-all inter-rater exact agreement percentage for the survey of 80.1% compared favorably with the a priori criterion level of 80% exact agreement (Roberton & DiRocco, 1981). Sections 7, 8, 10, and 11 were omitted from this exact agreement computation since no rotating or rocking equipment, and since no designated sand play or designated wading pool area existed in Candler Park.

Table 2.2 Inter-rater exact agreement percentage for section 3 as a whole and each of its items listed individually: from the National Elementary School Playground Equipment Survey, Candler Park assessment.

INTER—RATER EXACT AGREEMENT; SECTION 3

• Section 3 Agreement Percentage (Type and Numbers of Equipment)	75.6%

Item No.	Percentage
Flat Slides	75.0
Tube Slides	100.0
Swing Structures	45.5
Exer-Glides	82.4
Merry-Go-Rounds	100.0
SeeSaws	100.0
Suspended Bridge	93.2
Balance Beams	43.2
Spring Roxkers	56.4
Geodesic Dome Climbers	100.0
Firemans' Pole	88.1
Monkey Bars	67.6
Parallel Bars	94.1
Overhead Ladder	57.1
Chinning Bars	84.6
Sand Play Area	100.0
Water Play Area	100.0
Equipment Separated	16.2
Equipment Interconnected	50.0

Table 2.1, 2.2, 2.3 & 2.4 show the inter-rater exact agreement for the sections and the items on the survey which represent equipment which did exist at Candler Park.

Table 2.3 Inter-rater exact agreement percentage for section 4 & 5 as a whole and each of their items listed individually: from the National Elementary School Playground Equipment Survey, Candler Park assessment.

INTER—RATER EXACT AGREEMENT; SECTIONS 4 & 5

• Section 4 Agreement Percentage (Swinging Equipment)	85.7%
• Section 5 Agreement Percentage (Sliding Equipment)	76.6%

Item No.	Percentage
4.1 number of seats	38.6
4.2 metal or wood seats	43.2
4.3 swivel type	97.6
4.4 designed for young children	95.5
4.5 young children swings seperated	69.8
4.6 barriers around swings	100.0
4.7 firmly anchored	92.7
4.8 sharp corners, edges, or projections	72.7
4.9 moving parts good working order	79.1
4.10 covered chains	97.7
4.11 distance between	90.7
4.12 surface material	61.9
5.1 broken parts	50.0
5.2 sharp corners, edges, or projections	65.0
5.3 firmly anchored	72.1
5.4 wide slide	97.7
5.5 stable, smooth protrusion free sliding surface	83.7
5.6 deceleration chute	65.9
5.7 end of slide13" above ground	84.1
5.8 highest point on slide	70.5
5.9 guardrail around platform	88.6
5.10 surface material	88.1

Table 2.4 Inter-rater exact agreement percentage for section 6,9 & 12 as a whole and each of their items listed individually: from the National Elementary School Playground Equipment Survey, Candler Park assessment.

INTER—RATER EXACT AGREEMENT; SECTIONS 6,9,12

• Section 6 Agreement Percentage (Climbing Equipment)	63.7%
• Section 9 Agreement Percentage (Sliding Equipment)	75.5%
• Section 12 Agreement Percentage (Signs, Trees, Pathways)	81.1%

Item No.	Percentage
6.1 securely fastened	60.5
6.2 firmly anchored	100.0
6.3 finger traps	63.6
6.4 hand hold diameters	64.1
6.5 sharp corners, edges, or protrusions	57.1
6.6 horizontal entrapments	53.7
6.7 V entrapments	57.5
6.8 maximum height	26.2
6.9 surface materials	88.1
9.1 firmly anchored	95.5
9.2 securely fastened	56.8
9.3 sharp corners, edges, or protrusions	63.6
9.4 highest seating surface height	77.3
9.5 handholds	88.6
9.6 body parts passing beneath equipment	86.0
9.7 cushioned impact	93.2
9.8 pivotal parts	81.8
9.9 surface materials	54.5
12.1 signs available-seek help	100.0
12.2 signs available-use restrictions	100.0
12.3 signs available-exclude animals	100.0
12.4 number of trees	64.3
12.5 shade structures	69.0
12.6 hard surfaces for wheel toys	54.8

Considering the number of volunteers trained, the time constraints, and the stringent procedure used to establish the objectivity of the survey, the committee membership considered the whole instrument exact agreement reasonably high. Guided by the agreement percentages of individual items on the survey and utilizing some written comments on the instruments submitted by the trained volunteers following the field test, selected items on the survey were reworded or restructured to form a revised survey instrument for future use. This revised copy is called the AAHPERD-AALR—COP, Playground Equipment Assessment Survey-Sp1987 (**PEA**). It is presented in its entirety in Appendix 2D.

Project Data Compilation

A total of 206 playground surveys completed by 34 of the original 44 trained volunteers were sent to Dr. Louis Bowers at the University of South Florida and tabulated on a master sheet under Dr. Bower's supervision by Cheryl Menino and Brett Harper, both graduate research assistants. Dr. Bowers double checked all raw data tabulations and then used these figures to calculate percentages or mean scores depending upon the type of item response.

The scores were then forwarded to members of the National Elementary School Playground Equipment Survey Sub-Committee of the Committee on Play for preparation of this document. The 206 surveys represented playgrounds in 23 different states. While the sample number of playgrounds surveyed was not as large as had been anticipated, the 206 surveys represented a random selection process with broad geographical coverage of the northeastern, southeastern, south central, north central, northwestern, and southwestern states. However, Figure 2.6 demonstrates limited representation in the northeastern region of the United States. The distribution of the location of playgrounds surveyed within each state within the United States is also shown (see Figure 2.6).

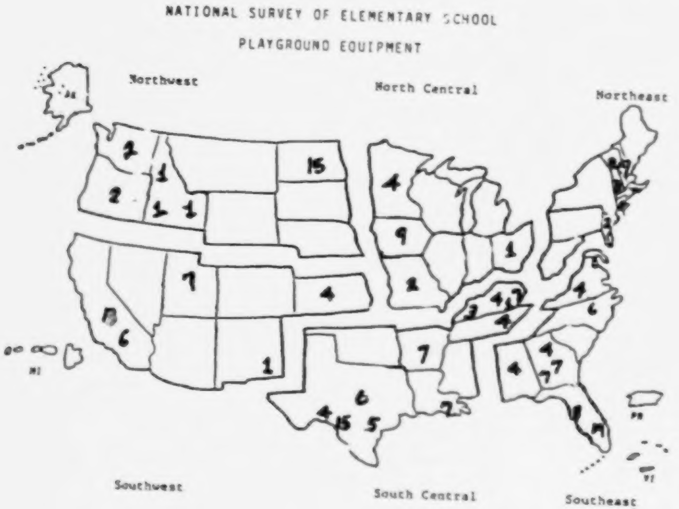


Figure 2.6 A map of the United States of America which indicates the regions and the states of the nation in which the survey was conducted.

In addition to providing current information about the status of playground equipment in the elementary schools of our nation, a major contribution of the National Elementary Playground Equipment Survey Project is that it has produced a reasonably objective survey instrument. It will assist elementary schools, recreation centers, and interested others in the assessment of playground equipment provided for our children.

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CHAPTER 3

RESULTS OF THE SURVEY

by

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The information reported in this chapter was tabulated and percentages computed at the University of South Florida. Tables used to display the data were developed at North Texas State University.

The following is a series of 25 tables which demonstrate the results of administration of the National Elementary School Playground Survey. They are based on assessments of 206 playgrounds located in 23 states which were surveyed by 34 trained administrators. These playgrounds were located at elementary schools which were randomly selected from those in each of the school districts surveyed.

Sections one, two and three from the assessment instrument (see Appendix 2A) were those which dealt with information of a general nature. The subsequent sections (4-12) which contained information for individual pieces of equipment. Basically, section one recorded the location and general accessibility of the equipment (see Table 3.1). Section two recorded the placement and size of the equipment (see Table 3.2). Section three recorded the types and numbers of equipment (see Table 3.3).

Figure 3.1 Results of data compilation for section one are listed in this table.

Survey Section 1: Location and Accessibility of Playground Equipment.

	Item	% yes	% no
1.1	easily viewed	78	22
1.2	three foot wall	70	30
1.3	wheelchair access to equipment	20	80
1.4	wheelchair access on equipment	18	82

Figure 3.2 Results of data compilation for section two are listed in this table.

Survey Section 2: Placement and size of equipment.

	Item	% yes	% no
2.1	ten foot space between equipment	70	30
2.2	traffic patterns on designated pathways	67	33
2.3	smaller equipment for younger children	64	36
2.4	large & small equipment separated	57	43
2.5	exposed concrete footings	5.6 per playground	

Figure 3.3 Results of data compilation for section three are listed in this table.

Survey Section 3: Types and Numbers of Equipment

Equipment	total no. present	ave. per playground	% total equipment
flat slides	282	1.36	9.2
tube slides	18	.09	0.6
swing structures	397	2.02	13.0
exer-glides	6	.03	0.2
merry-go-round	44	.23	1.4
seesaws	183	.93	6.0
suspended bridge	38	.19	1.3
balance beams	249	1.27	8.1
spring rockers	84	.43	2.7
geodesic dome climber	109	.52	3.5
fireman pole	281	1.43	2.7
monkey bars	240	1.22	7.8
parallel bars	152	.78	4.9
overhead ladders	323	1.64	10.5
chinning bars	512	2.63	16.6
sand play containers	41	.21	1.3
water play containers	32	.17	1.0
overhead rings	25	.12	.8
assorted climbers	21	.11	.7
tunnels	15	.08	.5
vertical climbers	13	.06	.4
chain net climbers	5	.02	.2
Total pieces of equipment	3070		99.62

Section four of the Survey is concerned with swinging equipment found on 206 playgrounds across the nation. The next three tables report results from this section (see Table 3.4a, 3.4b &3.4c).

Figure 3.4a Partial results of data compilation for section four are listed in this table.

Survey Section 4:
Swing equipment, descriptive information.

	Item	number	total #	percent	Misc.
4.1	# swing seats	6.3/plgrd			
4.2	# metal/wood seats		195*	15%	
4.3	# swivel seats		65*	5%	
4.11	distance between seats				26 inches

* From a total of 1298 available swing seats

Figure 3.4b Partial results of data compilation for section four are listed in this table.

Survey Section 4:
Percentages for Swinging Equipment

	item	% yes	% no
4.4	swings for young children	49	51
4.5	separate young children swing structure	50	50
4.6	swing barriers	6	94
4.7	structures firmly anchored	99	1
4.8	sharp edges, projections	26	74
4.9	moving parts in good repair	65	35
4.10	chains covered	9	91

Figure 3.4c Partial results of data compilation for section four are listed in this table.

Survey Section 4:
Surfacing Materials Found Under the Swing

Material	% material
concrete	0
asphalt	4
grass	18
clay	15
sand	27
mulch	1
pea gravel	17
rubber matting	2
hard packed dirt	9
hard packed rocks	4
tan bark	2

Section 5 was designed to collect information on sliding equipment from 206 playgrounds from across the nation. The next three tables include a report of the findings of this part of the assessment (see Table 3.5a, 3.5b & 3.5c).

Figure 3.5a Partial results of data compilation for section five are listed in this table.

Survey Section 5:
Percentages for 300 pieces of sliding equipment.

	Item	% yes	% no
5.1	broken equipment	29	71
5.2	sharp edges, protrusions	34	66
5.3	structures firmly anchored	88	12
5.4	wide slide	26	74
5.5	safe sliding surface	82	18
5.6	deceleration chute	77	23
5.7	13" high slide exit	65	35
5.8	guardrail on platform	84	16

Figure 3.5b Partial results of data compilation for section five are listed in this table.

Survey Section 5:
Percentages for Sliding Equipment Height,
Based on Item 5.8 for 300 Pieces

Height	% slide structures
under 8 feet	20
eight feet - 9 feet 11.9 inches	40
10 feet - 10 feet 11.9 inches	30
11 feet - up	10

Figure 3.5c Partial results of data compilation for section five are listed in this table.

Survey Section 5: Surface Materials Found Under 300 Pieces of Sliding Equipment

Material	% material
concrete	0
asphalt	4
grass	14
clay	19
sand	28
mulch	2
pea gravel	13
rubber matting	2
hard packed dirt	14
tan bark	2
large gravel	3

Section six of the Survey instrument provided information concerning climbing equipment assessed on 206 elementary school playgrounds from across the nation. The following three tables present the findings of this section (see Tables 3.6a, 3.6b & 3.6c).

Figure 3.6a Partial results of data compilation for section six are listed in this table.

Survey Section 6:
Percentages for 944 Pieces of Climbing Equipment

	Item	% yes	% no
6.1	securely fastened parts	82	18
6.2	firmly anchored structures	91	9
6.3	finger traps in pipes	31	69
6.5	sharp edges, protrusions	41	59
6.6	horizontal levels between 7 & 11 inches wide	63	37
6.7	V angle entrapment	12	88
6.4	hand hold diameter	2.45 inches	

Figure 3.6b Partial results of data compilation for section six are listed in this table.

Survey Section 6:
Percentages for Climbing Equipment Height, Based on Item 6.8 for 944 Pieces

Height	% climbing structures
< 9 feet	60
< 10 feet	50
< 12 feet	30
< 13 feet	20
< 15 feet	10

average maximum height for climbing equipment mentioned above = 9.3 feet

Figure 3.6c Partial results of data compilation for section six are listed in this table.

Survey Section 6:
Surface Materials Found Under 944 Pieces of Climbing Equipment with an Average Maximum Height of 9.3 Feet.

Material	% material
concrete	1
asphalt	4
grass	19
clay	18
sand	24
mulch	2
pea gravel	16
rubber matting	3
hard packed dirt	10
tan bark	1
large gravel	2

As a part of the assessment instrument, section 7 was developed to collect information concerning rotating equipment. This information is available in the next two tables (see Tables 3.7a & 3.7b).

Figure 3.7a Partial results of data compilation for section seven are listed in this table.

Survey Section 7:
Percentages for 44 Pieces of Rotating Equipment

	item	% yes	% no
7.1	firmly anchored structures	89	11
7.2	securely fastened parts	74	26
7.3	sharp edges, protrusions	47	53
7.4	rotation-post area open	53	47
7.5	perimeter clearing of 20 feet	38	62

Figure 3.7b Partial results of data compilation for section seven are listed in this table.

Survey Section 7:
Surface Faterials Found
Under 44 Pieces of Rotating Equipment

Material	% material
concrete	7
asphalt	14
grass	14
clay	9
sand	7
mulch	3
pea gravel	16
rubber matting	6
hard packed dirt	9
tan bark	12
large gravel	3

Rocking equipment constitutes a small part of the elementary school playground equipment. The total reported number of rocking pieces of equipment is 33, found on 206 sampled playgrounds from across the nation (see Tables 3.8a & 3.8b).

Figure 3.8a Partial results of data compilation for section eight are listed in this table.

Survey Section 8:
Percentages for 33 Pieces of Rocking Equipment

	Item	% yes	% no
8.1	firmly anchored structures	86	14
8.2	all parts are present	93	7
8.3	all parts are securely fastened	83	17
8.4	sharp edges, protrusions	24	76
8.5	seating less than 30 inches from the ground	82	18
8.6	3 inch long hand hold	74	26
8.7	4x6 inch foot rest	78	22
8.8	spring action pinches possible	38	62

Figure 3.8b Partial results of data compilation for section eight are listed in this table.

Survey Section 8:
Surface Materials Found
Under 33 Pieces of Rocking Equipment

Material	% material
concrete	10
asphalt	3
grass	17
sand	24
pea gravel	24
rubber matting	3
hard packed dirt	10
tan bark	3
large gravel	6

See saw equipment structures were the subject for section 9 of the survey. Of the 206 playgrounds surveyed 183 pieces of see saw equipment were assessed. Listed below are two tables which record the results of that assessment (see Tables 3.9a & 3.9b).

Figure 3.9a Partial results of data compilation for section nine are listed in this table.

Survey Section 9:
Percentages for 183 Pieces of See Saw Equipment

	Item	% yes	% no
9.1	firmly anchored structures	93	7
9.2	all parts are securely fastened	70	30
9.3	sharp edges, protrusions	53	47
9.5	3 inch double hand holds	55	45
9.6	body can pass beneath while its in action	84	16
9.7	cushioned ground strike	14	86
9.8	accessible pivotal moving parts	51	49
9.4	seating height - average at the highest point	3.8 feet	

Figure 3.9b Partial results of data compilation for section nine are listed in this table.

Survey Section 9:
Surface Materials Found
Under 183 Pieces of See Saw Equipment

Material	% material
concrete	8
asphalt	3
grass	21
clay	14
sand	14
mulch	2
pea gravel	18
rubber matting	2
hard packed rocks	10
roots and hard packed rocks	8

Section ten was designated for the assessment of sand play areas on the elementary school playgrounds. Of the 206 playgrounds reviewed 41 sand play areas were located and assessed. Table 3.10 displays the results of that assessment.

Figure 3.10 Partial results of data compilation for section ten are listed in this table.

Survey Section 10:
Percentages for 41 Designated Sand Play Areas

Item		% yes	% no
10.1	clean and debris free	61	39
10.2	good drainage apparent	61	39
10.3	covered or located to exclude animals	12	88
10.4	adult seating available	28	72

Section eleven of the assessment instrument was devoted to the review of water play facilities on the elementary school playgrounds in the nation. Of the 206 playgrounds reviewed 32 wading pools were located and assessed. Table 3.11 is a display of the results of that assessment.

Figure 3.11 Partial results of data compilation for section eleven are listed in this table.

Survey Section 11:
Percentages for 32 Wading Pools

Item		% yes	% no
11.1	fenced and gated	100	0
11.2	clear and free of debris	40	60
11.4	adult seating provided	83	17
11.3	Filled water — average depth	12.6 inches	

The final section of the National Elementary School Playground Equipment Survey was concerned with the report of information about 1) signs used on the playground 2) trees and structures that may provide shade and 3) pathways designed for use by the players who might be using wheel toys like trikes or wagons. Table 3.12 is a report of the results of that assessment.

Figure 3.12 Partial results of data compilation for section twelve are listed in this table.

Survey Section 12:
Percentages for 206 Playgrounds with Signs, Trees and Pathways

	item	% yes	% no
12.1	signs which give help	4	96
12.2	signs which suggest restricted or limited use	3	97
12.3	signs which prohibit animals	4	96
12.5	shade available from structures	18	82
12.6	hard surfaces which could be used for wheel toys	48	52
12.4	average per playground	6.9 trees	

The National Survey of Elementary School Playground Equipment and the instrument used in the project was designed to provide a wide range of information concerning the state of the playgrounds in our elementary schools. The report of that information in tables 1 through 12 provide a wide ranging view of those playgrounds. Both limitations and advantages of the currently available equipments become evident as a review of this information is undertaken. The next chapters will be used to discuss this information and its implications.

CHAPTER 4

LOCATION, ACCESSIBILITY, AND EQUIPMENT ON PLAYGROUNDS

by

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Elementary school playgrounds in the 1980's provide insights into the brief history of the playground movement in the United States. The first school playgrounds were built in urban areas in an effort to provide an alternative to dangerous play in the streets (Sutton-Smith, 1986). Playground builders of the period recommended plenty of space for organized, recreational games. School playgrounds also were intended to serve the entire community. Because there was concern over mischief and delinquency which might occur if teenagers played without supervision, the first playgrounds were arranged to permit such organized sports and games as baseball, volleyball, basketball, tetherball, and tennis. Play equipment for younger children was a secondary and minor concern. Sand bins, seesaws, swings, giant strides, and slides were the most common pieces of equipment (Wortham, 1985).

Between the 1930's and 1950's, public and elementary school playgrounds were expanded from their humble beginnings in earlier decades. Equipment recommended for school playgrounds was described by A Committee on Standards in Playground Apparatus, appointed by the National Recreation Association, as follows:

1. For preschool children (under six years): chair swings (set of six), sandbox (in two sections), small slide, and simple low climbing device.
2. For children of elementary school age (6-12 years): swing frame12 feet high (set of six), slide 8 feet high (16 feet long), horizontal ladder, giant stride, balance beam, horizontal bar, seesaws, traveling rings, and low climbing device (Butler, 1960, p. 17).

Particularly within the 1970's and 1980's, playground design has reflected a more comprehensive approach to children's play needs (Wortham, 1985). Contemporary playgrounds are designed to encourage the child's socio-emotional and cognitive development in addition to motor development through play opportunities (Moore, 1985). The designer of contemporary play environments, often called creative playgrounds, is concerned with functionality, safety, and aesthetics. The creative playground usually includes a multi-purpose climbing structure with various entry routes. A basic platform frequently has ramps, ladders, slides, fireman poles, tire rafts, suspended bridges, and net climbers attached. The structure is supposed to encourage socio-dramatic play, fantasy play, and motor play. The creative playground includes open areas for games of varying levels of organization, construction areas, and opportunities for creative activities.

Safety Considerations

The United States Consumer Products Safety Commission has published guidelines for playgrounds and play equipment that include safety considerations for location, accessibility placement, and size of equipment. The Handbook for Public Playground Safety (USPSC, 1980) is used as the major resource for safety considerations in this chapter.

In terms of location or the overall playground site, the USPSC has made recommendations about visual supervision of the play area and enclosures. In regard to playground supervision, planners are advised to keep the site free of visual barriers that will hamper supervision. In simple terms, adult supervisors should be able to see all parts of the play environment wherever they are located on the playground site. Not only should adults supervise children's play but teachers and members of the community should also be able to observe individuals who might cause harm to children.

A second concern is for surrounding the site with a fence or other enclosure that will protect playing children. The fence or enclosure is primarily thought to be a safety feature, a means to keep children from runnning into the street. The child preoccupied with a play activity might chase a ball or otherwise leave the playground area without considering the danger. Younger children who are not alert to the dangers of traffic or the possibility of becoming lost, might wander away from a play area without the restraints of a fence.

The USCPSC has also made several recommendations regarding spacing between equipment. The safe spacing of equipment is described as follows:

> No matter how play spaces are organized, however, it is essential to provide adequate space around each piece of playground equipment. Planning should take into account the equipment's *use zone*, that is, any activity or movement which can be expected around the equipment. For example, sufficient space should be alloted for swing sets to accommodate the largest area through which the swing travels, including a child's extended legs. Adequate room also must be provided for children to exit slides, jump from swings, and "spin-off" from merry-go-rounds. Buildings, paths, and walkways, gates, fences, and other play areas such as sand boxes should be located at least 8 feet away from the estimated *use zone* associated with a piece of playground equipment. (USCPSC, 1980a, p. 6)

Traffic patterns that emerge from various types of play taking place on the playground should also be a concern when locating equipment. The U.S. Consumer Product Safety Commission recommends the following for placement of equipment:

> Equipment should also be arranged to accommodate the traffic pattern of children at play. For example, playground apparatus should be placed away from ball fields or other areas where running children, intent upon their games, may accidentally move in front of swings, exit areas or slides, etc. Also, equipment should be placed so that one area is not overcrowded while another area remains underused. Poorly placed equipment can lead to misuse and accidents. (USCPSC, 1980a, p. 6)

Unfortunately, the USCPSC did not deal with handicap accessibility. This lack of attention probably reflects the general lack of public concern and awareness for children with handicapping conditions and their needs for safe play. Attempts by children with physical handicaps to use a playground which is not properly designed for them, may lead to injuries as well as almost certain frustration.

One final concern addressed by the USCPSC was the stability and maintenance of large play structures. The Commission recommended that:

> Equipment should be firmly anchored in the ground by concrete. Place concrete footings below ground level to prevent tripping and to protect a child in case of a fall. If any exposed concrete footings do exist, cover them with earth or padding. Also consider recovering worn surfaces where rocks or other hazards may protrude. (USCPSC, 1980a, p. 10)

Developmental and Play Considerations

The original purpose for playgrounds and play equipment was for motor development. Currently, playground designers must consider all facets of development including cognitive, social and emotional, motor and language development.

Frost and Klein (1983) have suggested that playgrounds can facilitate child development by encouraging changes in the cognitive, motor, social, dramatic, and play domains. Likewise, Crum and Eckert (1985) documented important variables in the development of play patterns by elementary school children and found that different aspects of playgrounds encouraged different levels of activity organization. Additionally, Roberton and Halverson (1984) have observed a number of developmental changes that children undergo in their first few years of life. Such things as cognitive, psychosocial, perceptual, and aesthetic development are areas which these authors suggest need encouragement in children's school and home environments.

These developmental needs and differences have implications for playground designers. Not only does the play environment need to include play opportunities to facilitate various types of play, but design considerations must be appropriate for children at different ages and stages of development.

Frost and Klein (1983) considered playground arrangement in terms of zones. They proposed that all forms of play—motor, cognitive, social and dramatic—are facilitated by the consideration of zoning the playground for different play purposes. If the play development of children is to be considered, then areas of the playground are arranged to nurture that development. Although zones are defined by boundaries, the space should invite movement within zones and between zones as children integrate one type of play with another.

Because developmental play needs are different for various age groups in elementary schools, playground equipment for younger children is different than that designed for older children. Separate play areas should be arranged for the age groups represented so that equipment designed for younger children is scaled down and has a complexity of physical challenge that is developmentally appropriate (Crum & Eckert, 1985).

Beyond developmental and age differences, handicapped children have unique requirements for outdoor play environments.

Michelman (1974) proposed that play environments for handicapped children should include the following: "Provide a match between the child's abilities, interests, and environmental expectations. Play equipment should adjust to more than one purpose, more than one child, and more than one developmental level" (Frost & Klein, 1983, p. 222). Developmental needs of handicapped children vary depending on the combination of handicaps. Modifications of the playground are essential if physically handicapped children are to have the opportunity for play experiences that will enhance their development.

Location and Accessibility of Playgrounds -- Data Summary

The location and the accessibility of playgrounds were surveyed in this study by asking about the visibility of play equipment, enclosure of play areas, and accessibility of play equipment for children confined to a wheelchair (see Appendix A).

Questions on the survey asked if the play equipment was easily in view of nearby residents and/or passersby. Over three-fourths of the playgrounds surveyed (78%) were open to view. This finding means that a vast majority of the playgrounds studied are easily supervised and meet the safety standards of the United States Consumer Products Safety Commission.

The elementary school playgrounds surveyed were checked to determine if play equipment was surrounded by a fence or wall at least 3 feet high. Although almost one-third of the playgrounds did not have a fence of some type surrounding the area, 70% (144 of 206 playgrounds) did have such an enclosure. The question asked if play equipment was enclosed. In reality the enclosure might surround the playground site rather than equipment alone.

Accessibility to play equipment by children confined to wheelchairs is very limited according to this research study. The results of the survey indicated that only 20%, or one in five of all playgrounds studied, had hard surfaces that would enable children in wheelchairs access to play equipment.

A very small percentage of the playgrounds surveyed (3.6%) had play equipment designed for use by children in wheelchairs. These results are an indicator that very, very few playgrounds have been designed with handicapped children in mind.

Results of the survey did not indicate whether or not schools assessed served handicapped children. The low pecentage may be indicative of the possibility that handicapped children are not present at all elementary schools. In large urban districts certain schools might have special provisions for children confined to wheelchairs. However, from the results of this report it seems evident that mainstreaming of children academically does not extend to outdoor play equipment. Thus, the surveyed elementary school playgrounds presently do not match children's abilities, interests, and developmental levels as described by Michelman (1974).

Location and Accessibility of Playgrounds -- Implications

To meet USCPSC safety standards playgrounds should be surrounded by an enclosure, while at the same time maintain visibility for supervision purposes. Playgrounds in this survey met these requirements well.

The merits of visibility from both within and outside the playground can be affected by the type of enclosure used. Questions in the survey asked whether or not a fence or wall enclosed the play equipment. The United States Consumer Products Safety Commission guidelines suggest that trees or shrubbery forming an impenetrable barrier could be used as well as a fence. Both a wall or impenetrable shrubbery can limit visibility of passersby and community members. This lack of visibility can be a concern because inappropriate play activities would not be observable, especially after school hours, thus compromising the safety of playing children. Many would consider walls or shrubbery to be less adequate than an open-type of fencing for enclosing the play environment.

An exception to having the playground open to view has emerged with the recent concern about the kidnapping of children. Some institutions located adjacent to major thoroughfares or within dangerous urban areas may feel inclined to minimizing attracting passersby to play areas by constructing privacy fences or enclosures that limit visibility.

Another possible negative side-effect of fencing is that many schools and institutions lock the entrance to playgrounds after school hours and during weekends and holidays. For children in some localities locked gates limit access to the only available play area. However, Henninger, Strickland and Frost (1985) reported that playgrounds not closed off after school hours result in the use of the area in unconventional and undesirable ways. In addition, the playground can become cluttered with litter and thus be a potential health hazard.

The findings of this survey give strong evidence that elementary school playgrounds are not adapted for handicapping conditions, not only making them unsafe for handicapped children, but also inaccessible to children in wheelchairs. The lack of play facilities that include access for wheelchairs can be partially explained by the nature of playground design and construction. Many schools are 30 years or older. A common practice in this country has been to develop the playground at the time of initial school construction. Thereafter little improvement occurs when newer and better equipment becomes available. Older school playgrounds, therefore, may never have been resdesigned to include wheelchair accessible equipment.

More recent playground designs that lack provisions for play of handicapped children may reflect a lack of public awareness of the play needs of handicapped children. Information is available about ways to design accessible equipment; additionally, some commercial manufacturers are now designing equipment for use by handicapped and nonhandicapped children.

Hogan (1985) described the design of a hospital playground in which picnic tables were extended 2 feet beyond the legs of benches so that children in wheelchairs or gurneys could be located adjacent to regular seating areas. In addition, the playground had an extra wide doorway to encourage easy access. Finally, a large off-the-road tire was set on edge half-way into the ground permitting crawling into and on top of the tire by non-ambulatory children. While these examples describe some commendable attempts to open up playgrounds' access, they are too few and too limited.

Developmental needs of handicapped children vary depending upon the types of handicapping conditions. A wide variety of modifications in existing playground environments as well as alterations in traditional playground design concepts are needed. On one hand, playgrounds can be designed to specifically address a particular handicapping condition. However, general elementary school playgrounds probably cannot afford simply to attend to a single handicap or particular handicapped child. Rather there is a need for a whole set of new design and modification criteria for opening up playgrounds to children with handicapping conditions. Hogan (1985) has described how ramps and switchbacks can be designed to give wheelchair access to a treehouse 42 inches above the ground. The incline and width of the ramps accommodated rolling stretchers and life support equipment as well as wheelchairs. Frost and Klein (1983) likewise described dimensions for ramps, switchbacks, gates, and doorways for playground developers and builders to allow and encourage equipment use by non-ambulatory children. Additional design information and ideas for use with the handicapped child are needed for both traditional and contemporary play structures.

Placement and Size of Equipment - Data Summary

The USCPSC recommended that pieces of equipment and structures should be placed at least 10 feet from other structures. A large percentage of playgrounds surveyed (70%) adhered to this principle, either by design or by accident. Playgrounds located on large, open plots of land tended to have well-spaced equipment naturally due to availability of space.

Questions on the survey also were concerned with equipment location to avoid collision or interference with traffic patterns. Almost 80% of the playgrounds studied (77%) had equipment that was suitably located. While not all playgrounds surveyed are adhering to the USCPSC guideline in this respect, the survey results were very positive.

Crum and Eckert (1985) proposed that play equipment for younger children should be scaled down and have physical challenges that are developmentally appropriate. Although a majority of the playgrounds surveyed had smaller sized equipment (64%), it is important to note that one out of three playgrounds did not.

In terms of safety, the U.S. Consumer Product Safety Commission (USCPSC) advised that play spaces for young children should be separate so that they can be protected from the more active play of older children. In this respect, questions on the survey also tried to determine whether or not smaller equipment was present, and if it was separated from large equipment.

The results indicated that 56%, or slightly more than half of the playgrounds surveyed, had provisions for separating the play activities of younger children from older children. Although it is not known how many of the schools involved in the study served all ages of elementary school children, it is probable that many elementary schools serve both younger and older students.

One final concern about equipment placement addressed in the survey had to do with concrete footings used to support playground structures. Although having playground equipment firmly anchored is an asset, wear over a period of time caused footings in the playgrounds surveyed to be exposed. Results, however, did not determine what percentage of playgrounds did or did not have exposed footings. Instead the survey recorded the number of exposed footings per playground. The overall average of 5.6 exposed footings per playground is significant when considering that some of the playgrounds may not have had any exposed footings.

Placement and Size of Equipment - Implications

The U.S. Consumer Products Safety Commission described equipment location in terms of safety, balance of equipment use, misuse of equipment, and traffic patterns of children at play. Frost and Klein (1983) considered playground arrangement as more than the spacing of equipment. They proposed that all forms of play and categories of development can be encouraged with playground components arranged in zones designed for different play purposes. Although survey results indicated that play equipment in general was placed appropriately to meet safety considerations, there is little data to determine that they also met the developmental play needs of children. Survey results indicated that there were more playgrounds with traditional pieces of equipment such as seesaws, swings, and slides that promote motor development and exercise play than complex climbing structures and other playground features that contribute to all facets of development and play.

There are significant developmental differences in the play behaviors of younger and older children. Crum and Eckert (1985) determined that at age six there were activity differences between boys and girls. At age eight the size of the play group increased for girls. There were age differences for boys in activity organization and orientation, size and sex of the play group, and motor skill competency.

Play differences in younger and older children also are related to cognitive development (Frost & Klein, 1983; Roberton & Halverson, 1984). Preoperational children engage in sociodramatic play while children entering the period of concrete operations become more involved with organized games or games with rules. Younger children tend to play alone or alongside one another, while older children are able to engage in cooperative play activities within a group (Parten, 1932; Seagoe, 1970).

The implications of the play differences of younger and older children support the practice of designing smaller and less challenging equipment for younger children (Crum & Eckert, 1985; Roberton & Halverson, 1984). Separation of play areas for younger and older children for safety reasons also is indicated. Although schools that do not have separate play areas may attempt to alleviate the situation by scheduling separate play times for different age groups, it is only a partial solution. Younger children lack the coordination skills needed to use the play equipment designed for older children (Crum & Eckert, 1985). Inappropriate placement or combination of equipment for different ages results in built-in safety hazards (Henniger, Strickland & Frost, 1985).

Types and Numbers of Equipment - Data Summary

Although subsequent chapters will address specific sections from the survey and provide information about individual pieces of equipment, this section will discuss types and numbers of equipment as a whole. Table 4.1 shows the results of the survey with equipment listed in descending order of frequency.

> Over 22 different categories of equipment were observed on 206 playgrounds. The frequency ranged from a high of 512 chinning bars (an average of 2.6 per playground) to a low of 6 exerglides and 5 chain net climbers. Swings were the second most numerous piece of equipment with a total of 397 structures. Since swings are frequently sold in sets of 3, it would be expected that a playground with swings would usually have more than 1 seat.

Table 4.1 Equipment found on the playground includes a wide assortment of types. All are assumed to be of the traditional type since no interconnected structures were indicated in the results of the survey process.

Total Number	Average Per Playground	Percent of Total	Name of Equipment
512	2.63	16.6%	Chinning Bars
397	2.02	13.0%	Swing Structures
323	1.64	10.5%	Overhead Ladders
282	1.36	9.2%	Flat Slides
281	1.43	9.1%	Fireman's Poles
249	1.27	8.1%	Balance Beams
240	1.22	7.8%	Monkey Bars
183	.93	6.0%	Seesaws
152	.78	4.9%	Parallel Bars
109	.52	3.5%	Geodesic Dome
84	.43	2.7%	Spring Rockers
44	.23	1.4%	Merry-go-Round
41	.21	1.3%	Sand Play Containers
38	.19	1.3%	Suspended Bridge
32	.17	1.0%	Water Play Containers
25	.12	.8%	Overhead Rings
21	.11	.7%	Various Shaped Climbers
18	.09	.6%	Tube Slides
15	.08	.5%	Tunnels
13	.06	.4%	Vertical Ladders
6	.03	.2%	Exerglides
5	.02	.2%	Chain Net Climbers

Climbing equipment and components represented the largest group type. Chinning bars, overhead ladders, fireman's poles, monkey bars, parallel bars, geodesic dome climbers, overhead rings, vertical ladders, and various other climbers represented a majority of all the equipment (54.4%). The smallest subgrouping of equipment was sand and water play which represented only 2.3% of all the equipment.

Types and Number of Equipment - Implications

Results of the survey illustrate how the evolution of playgrounds progressed in this country. The first equipment to appear were structures for physical development, as well as single function play equipment. Almost half (49.3%) of the equipment surveyed in 1985 consisted of chinning bars, swing structures, overhead ladders, and flat slides, the same type of equipment first designed for elementary school playgrounds. Indeed, 85% of the equipment on the playgrounds surveyed consisted of metal equipment designed predominantly for motor play. Of these, the fireman's poles, balance beams, monkey bars, seesaws, and parallel bars made up 35.9% of the equipment on playgrounds surveyed. Conversely, equipment commonly associated with complex climbing structures made up only a small percentage of the equipment. Although suspended bridges, tube slides, tunnels, chain-net climbers and vertical ladders are manufactured as free-standing equipment. They are frequently part of a multi-purpose play environment designed to provide for group play experiences that facilitate social and emotional development, as well as motor development. However, from results of the survey we must assume that these pieces were located on the playground as free standing units since one section of the survey (see Appendix A, Section 3, #3.1) indicated that no interconnected structures were present on the playgrounds of the schools assessed. These play components comprised only 3% of the total equipment on the playgrounds surveyed.

In terms of safety, equipment most frequently found on the playgrounds also has been determined to be responsible for a high pecentage of playground accidents. According to the U.S. Consumer Product Safety Commission, climbing apparatus such as chinning bars and monkey bars were responsible for 42% of playground injuries in research conducted in 1978. Swings were involved in 23%, while slides were involved with 16% of injuries. Falls from these types of equipment were the main cause of accidents. The significance of the survey results is that this type of play equipment is predominant on elementary school playgrounds decades after more functional, safer play equipment has become available.

The results of the survey also have negative implications for the quality of children's play. Research conducted comparing playgrounds with conventional equipment and creative playgrounds determined that children's play choices vary when different types of equipment are available. Frost and Campbell (1985) found that on conventional playgrounds children preferred action-oriented equipment such as climbers, swings, slides, and merry-go-rounds, while on creative playgrounds, children chose fairly equally among the various possibilities. The findings indicate that while motor development play occurred on the conventional playground, dramatic play, and other mixed forms of play occurred on the creative playground.

Frost and Strickland (1985) studied children's play equipment choices at different age levels. Their findings included information that the most popular playground of children of various ages included equipment and space that accommodates various forms of play. In addition they found that fixed structures that primarily accommodate exercise play are more popular with older children ages six to nine than younger children.

Unfortunately the equipment most frequently identified in the survey is not only the most dangerous, but limits the type of play experiences elementary children can have. Motor development and exercise play are available on the playgrounds, but a very small percentage of the playgrounds provide for play possibilities in the other categories of children's development.

Conclusions

Results of the National Survey of Elementary School Playground Equipment were mixed for location, accessibility, and different equipment available. Playgrounds tend to be well-located with fences constructed to provide a safe play environment for young children. Although playground equipment is generally adequate in amount, few have playground equipment designed and constructed for handicapped children. Likewise, playground equipment for younger children is available on many playgrounds, but it is not necessarily located so that younger children have a separate play area.

The type of play equipment available on the playgrounds surveyed had negative implications for safety and the quality of children's play. Over 85% of the playground equipment reported there is the metal single-function equipment designed for motor development and exercise play. This equipment, first manufactured in the 1920's and 1930's, has been associated with a high percentage of playground injuries. Additionally, the equipment limits the types of play in which children can engage on the school playground.

At the same time survey results report few instances of contemporary playground structures present on elementary school playgrounds. It must be concluded that only a small percentage of children have the opportunity to be involved in comprehensive types of creative play associated with interconnected play structures. Thus, it can be said that the information available from playground research and improved playground design since 1950 have largely bypassed the elementary schools of the United States included in the survey.

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CHAPTER 5

SWINGS, SLIDES AND CLIMBING EQUIPMENT

by

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This chapter will focus on the implications for playground safety, play patterns, and child development based on the survey results.

Swings, playground equipment suspended so as to permit back and forth, and sometimes circular, pendular motion, represented the second most common moving piece of equipment observed on the 206 playgrounds in this survey. Types of swings ranged from the traditional rope and board swing to rotational swings made from automobile tires, chain supports and special three-dimensional swivels .

Table 5.1 Sections 4-5-6 of the survey instrument are shown.

National Elementary School Playground Equipment Survey
Sections 4 - 5 - 6

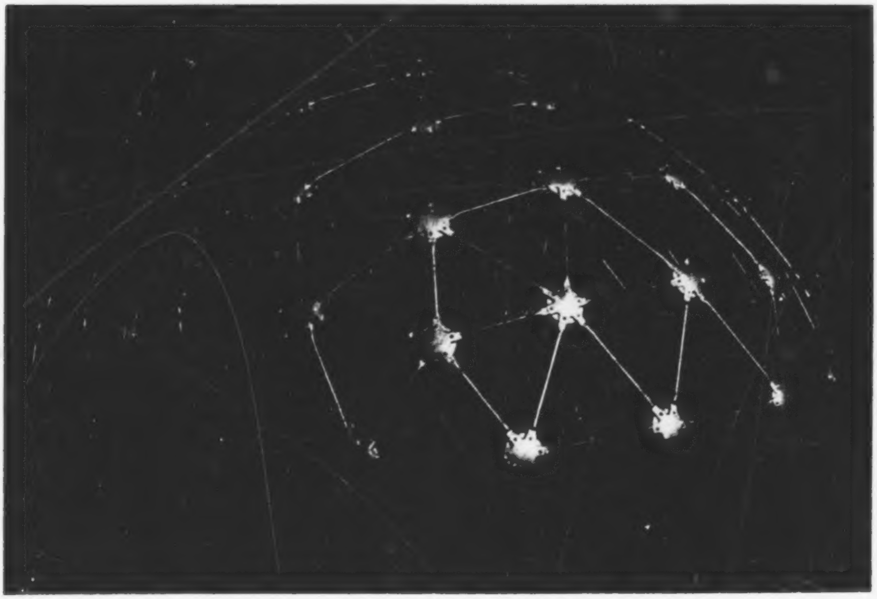
Section 4 - Swings (metal, wood, soft material pendulum type; tire swivel type)
Based on 397 pieces of equipment on 206 playgrounds

Section 5 - Slides (inclined, flat surface; tube; spiral)
Based on 300 pieces of equipment on 206 playgrounds

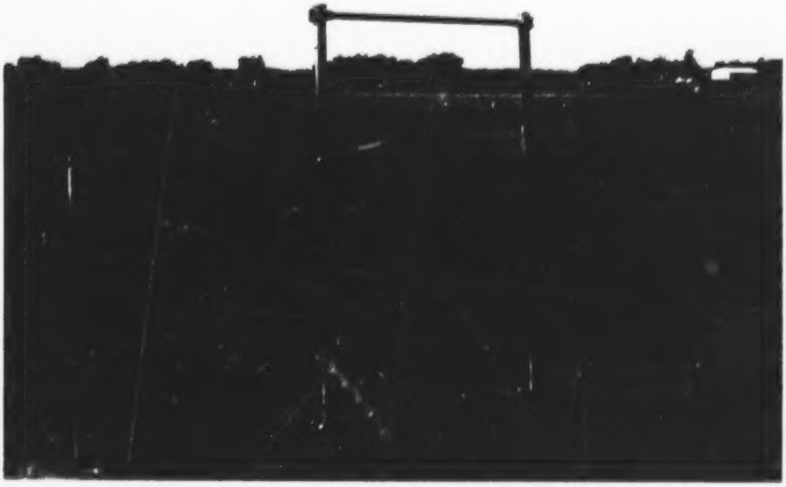
Section 6 - Climbers (chinning bars; overhead ladders; fireman pole; monkey bars; parrallel bars; geodesic domes; rings; chain nets; vertical ladders; tunnels; suspension bridge; balance beams...)
Based on 1983 pieces of equipment on 206 playgrounds

Slides were considered to be any inclined flat or tubular equipment whose surface promoted sliding activities. Observed equipment ranged from the standard above-ground straight slides and spiraling, tubular slides to those that were built-in to the sides of a hill using the natural landscape.

Finally, climbing equipment was the most prevalent piece of equipment observed (over one-half of all equipment in the survey). Equipment categorized as climbing ranged from simple chinning bars to geodesic domes and contemporary play structures.



Geodesic Dome



Chinning bars

Safety Considerations

The U.S. Consumer Product Safety Commission (USCPSC) (1980a) reported that falls and impacts represent at least 79% of all injuries on playgrounds (totals computed from a table listed on p. 3, USCPSC, 1980a). Particularly implicated in such accidents were swings, slides, and climbing equipment. These injuries were probably due to the height of equipment, movements possible through such equipment, and the high percentage of equipment use (fall injuries on swings = 20%; slides = 12%; and climbing equipment = 19%; total = 51% of injuries from falls).

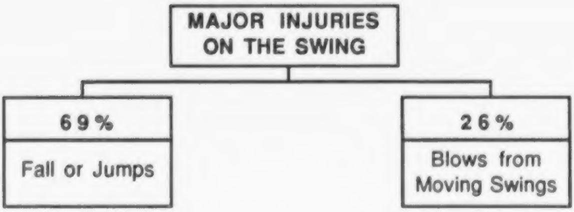


Figure 5.1 Injuries on the swings come primarily from falls or jumps and blows suffered when hit by a moving swing.

For example, injuries related to swings represented 23% of all types of playground injuries while slides accounted for 16% of all injuries, and climbing equipment was responsible for the most accidents of all types of injuries, 42% (USCPSC, 1980a, p. 3). Of all swinging injuries, 69% resulted from falls or jumps from swings while 26% resulted from a blow coming from the moving swing (see Figure 5.1). Most slide injuries (78%) resulted from: 1) falls over the side, from the platform, or from the steps due to roughhousing, 2) walking on the slide surface, and 3) slipping or losing one's grip (see Figure 5.2). Climbing equipment injuries were primarily due to falls (72%) from the apparatus caused by slipping, losing grip, or losing balance (USCPSC, 1980a, p. 3) (see Figure 5.3).

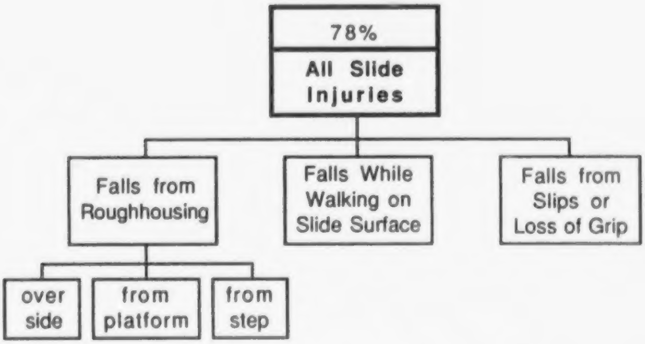


Figure 5.2 Most injuries on the slide occur from roughhousing, while walking on the sliding surface or from slips or loss of grip.

In general, the accidents and injuries from swings, slides, and climbing equipment described by the USCPSC (1980a) were not caused by improper design or maintenance of equipment. Rather, most of the injuries resulted from what the USCPSC described as either normal or 'improper' use of the equipment by children. Although subsequent sections will point out to what extent equipment was correctly designed (e.g., met the minimum 18 inch minimum clearance between swings and frames) and had been properly maintained (e.g., danger of swings breaking), *they do not suggest how to eliminate* what the USCPSC describes as the main cause of injuries resulting from swings, slides, or climbing equipment: misuse by children and improper supervision.

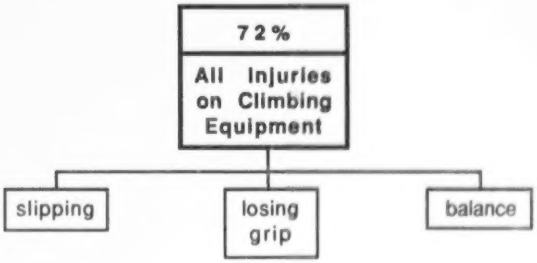


Figure 5.3 Slipping, losing grip and losing balance account for most injuries on climbing equipment.

The idea that children can misuse equipment during play is a concept which seems absurd to many persons. The concept of misuse is a glaring contradiction. On the one hand, children's play is labeled as "misuse." On the other hand, children are expected to play on equipment, exploring all possibilities during play. To resolve the contradiction it can only be concluded that misuse of structures by children during play is an expression of the way children play. If the assumption that many explorations should be possible during play is appropriate to the child's right to play, then profound implications for design of equipment can be drawn.

It is unreasonable to suggest that children misuse equipment or play improperly. Instead, equipment should support and encourage all play patterns. The statement that could be made safely without undermining the basic premises for play which underly this manuscript is that children surely do not always use equipment in manners for which it was designed. In the final analysis, the problem is the design of the equipment and not the play of the children who use it.

Developmental Play Considerations

Swings, slides, and climbing structures represent popular and diverse sets of playground equipment which may promote a variety of types of activity, play patterns, and motor skills. Swings, slides, and climbing equipment are all categorized by Crum and Eckert (1985) as "low-organization activities" which required only one or two motor skills performed in a closed environment. Such a low level of activity organization is seen also to require a low level of motor skill competency and is preferred more by females than males.

Crum and Eckert (1985) predicted that swings would rate as a feminine activity while climbing structures should be considered a masculine activity. It was discovered that 6 year old girls spent 61% of their time on such playground apparatus as swings, slides, and climbing structures while 8 year old girls spent only 21% of their time on the same equipment. In contrast, 6 year old boys spent 18% of their time on apparatus while no 8 year old boys spent any time on the same apparatus. Apparently swings, slides, and climbing equipment promoted only relatively simple motor skills which pertained to low and average ability levels (i.e., some older girls and younger boys) (see Figure 5.4).

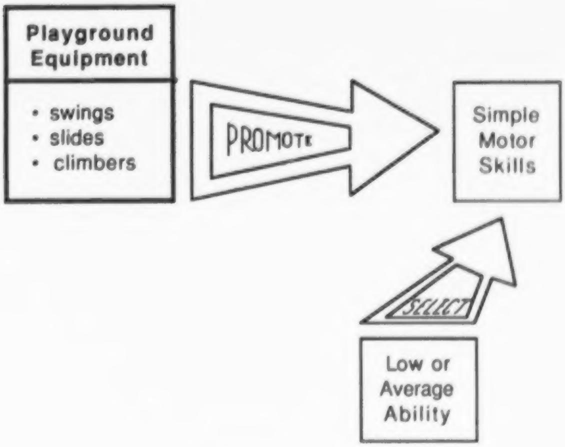


Figure 5.4 According to Crum and Eckert, traditional swings, slides, and climbers support simple motor skills which are selected for use by low to average players.

The Crum and Eckert data also indicated that boys, especially 8 year olds, preferred to play in larger peer groups than girls. For instance, 6 year old boys played in groups ranging in size from 1 to 6 peers averaging approximately 3 per group; on the other hand, 8 year old boys played in average groups of 8 peers, ranging from 1 to 13 per group.

In contrast, 6 year old girls played in groups of 1 to 6, averaging 2.4 per group while 8 year old girls also played in groups of 1 to 6, but averaged groups of 3 persons. Thus, average play group size made it more likely that girls of both 6 and 8 years would play in low organization activities such as playground apparatus while only 6 year old boys normally played in groups small enough to be encouraged by traditional play structures.

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Older boys tended toward higher level organizational activities, with higher levels of physical skill competency, and in larger groups. Thus, by 8 years of age, the most common types of playground equipment (traditional swings, slides, climbing equipment) do not suit the preferred play for most boys (see Figure 5.5).

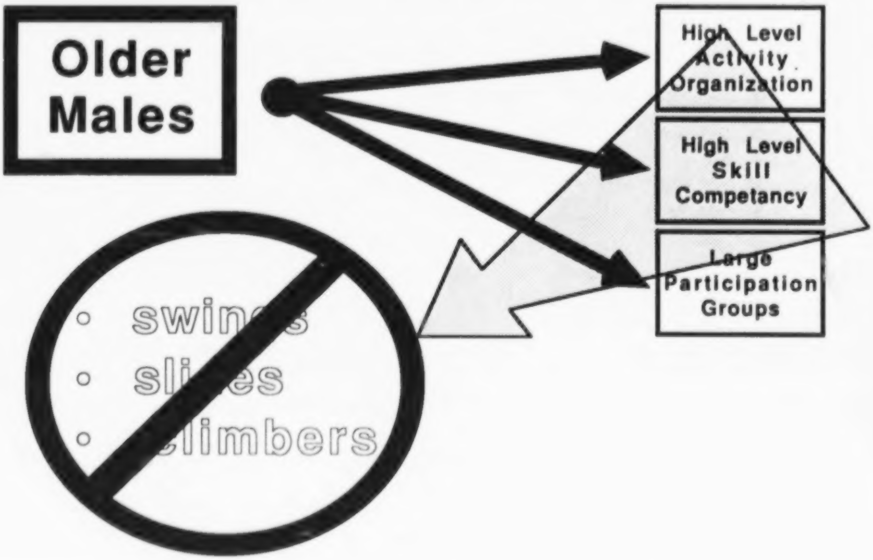

Older Males
High Level Activity Organization
High Level Skill Competancy
Large Participation Groups
swings
slides
climbers

Figure 5.5 Conclusions drawn from the work of Crum and Eckert (1985) suggest that traditional swings, slides, and climbers used in the intended manner may not meet the play preferences of males.

Certainly many typical swinging activities as observed on many playgrounds would not be classified as "closed" (i.e., constant, non-moving environment) as Gentile (1972) defined skills. The diversity of motor skills (leg pumping, running, pushing, jumping, and landing) that often accompany swinging suggest that swings may not simply promote the passive, non-locomotor activity Crum and Eckert implied. In addition, many slides and climbing structures represent environments that promote a variety of locomotor and non-locomotor skills (Roberton & Halverson, 1984) such as walking, running, jumping, hanging, swinging, climbing, twisting, turning, and rolling under a varied set of environmental conditions.

While the Crum and Eckert (1985) data suggest that, in the most part, swings, slides, and climbing structures foster small play groups, using low ability activities, two other suggestions may also be valid: 1) small group size during play may be an artifact of the single function, single person use intention of the equipment designed purposely not to handle large groups and 2) the equipment, when properly supervised during play, may actually be used to encourage higher organized activities or higher levels of skill competencies as Roberton and Halverson (1984) suggest. If supervisors are used to interact through instructional procedures with traditional equipment and thereby encourage combinations of complex skills required by some activities on swings, slides, and climbing equipment, then the result is likely to be increased problems associated with falls and injuries, according to the USCPSC (1980a) (see Figure 5.6).

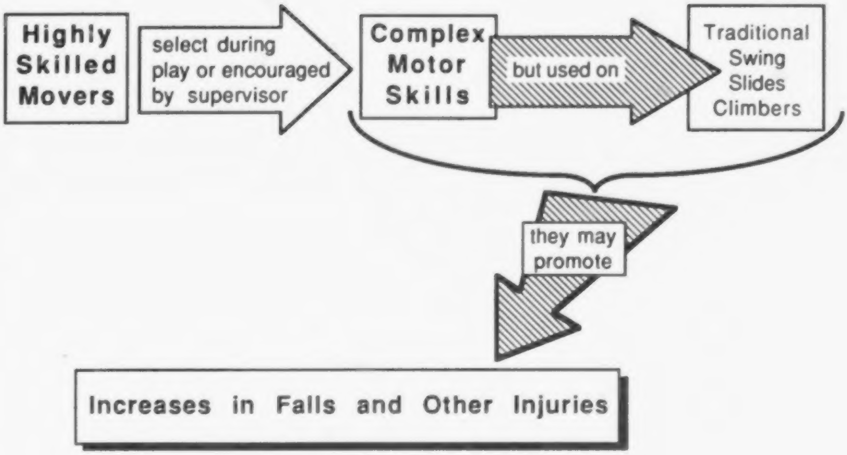

Highly Skilled Movers
select during play or encouraged by supervisor
Complex Motor Skills
but used on
Traditional Swing Slides Climbers
they may promote
Increases in Falls and Other Injuries

Figure 5.6 More complex combinations of skills used on swings, slides and climbers, may lead to injury.

Certainly, swinging activity in its most passive form (i.e., a child holding onto a swing being propelled by another person) can be categorized as either a nonmotor or low-organization activity (Crum & Eckert, 1986). The popularity of swings and slides on playgrounds, however, indicates that they fulfill basic perceptual needs such as vestibular and proprioceptive stimulation (Clark, Kreutzberg, & Chee, 1977) (see Figure 5.7). Acceleration of body movement provides stimulation of the semi-circular canals of the inner ear and apparently contributes to basic perceptual and motor development in some subtle, but important ways in young children (Clark et al., 1977).

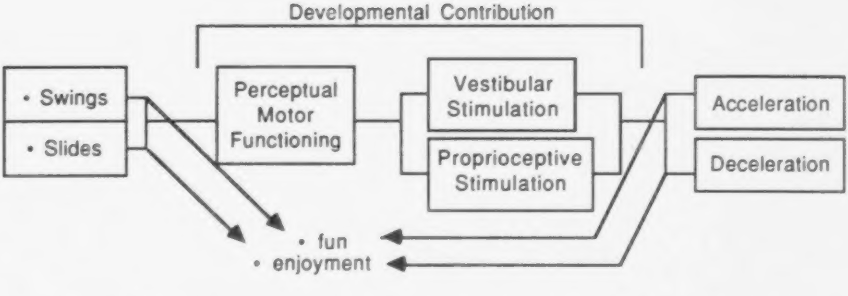

Developmental Contribution
• Swings
• Slides
Perceptual Motor Functioning
Vestibular Stimulation
Proprioceptive Stimulation
Acceleration
Deceleration
• fun
• enjoyment

Figure 5.7 The acceleration and deceleration experiences on swings and slides may contribute to improved perceptual motor functioning as well as provide fun experiences.

The pendular acceleration and deceleration received during swinging and the rapid acceleration of descending a slide may contribute to the basic development of balance and movement by young children. They also may permit young children to experience speeds and forces not always experienced elsewhere during activity. Finally, the rapid acceleration can provide vicarious thrills for some children and perhaps even fear for others.

While these equipments may aid in perceptual motor functioning they may also help with intellectual functioning. Children in the early primary grades (5-7 years old) are classified within Piaget's pre-operational stage of intelligence although around 7 years of age they begin to move into the concrete operational levels of intelligence (Roberton & Halverson, 1984). At the pre-operational stage, children are highly egocentric and animistic. This means they are very self-centered in their play and thought and they often engage in "make-believe" activities in which objects such as swings or climbing structures take on living characteristics.

Swings may become an animal to ride or a jet in which to fly while climbing structures serve as castles, houses, or forts.

Apparently such fantasy play is important for encouraging the development of young children (Parten, 1932) as they progress from pre-operational to concrete operational intelligence (see Figure 5.8). It is interesting to note that traditional play structures begin to lose their appeal and use by children around 7 and 8 years of age as they make the transition from the Piagetian pre-operational stage to the concrete operational stage (Crum & Eckert, 1985).

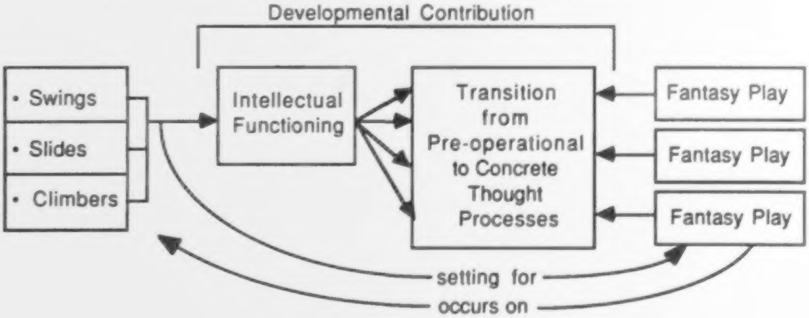


Figure 5.8 Fantasy play on swings, slides and climbers is associated with the Piagetian pre-operational thought pattern and may assist in the transition to concrete thought processes.

At about this same time, children's play and psychosocial development change from solitary and parallel play and pre-moral levels of development to more interactive and cooperative play as well as to conventional moral levels (Roberton & Halverson, 1984). As a consequence, advancing cognitive, moral, and play developmental levels may have implications for the decline of traditional play equipment used by 7 and 8 year old children (see Figure 5.9).

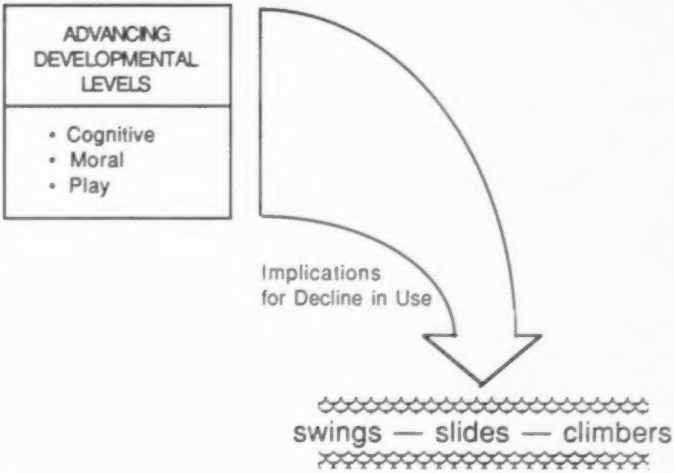

ADVANCING DEVELOPMENTAL LEVELS
• Cognitive
• Moral
• Play
Implications for Decline in Use
swings — slides — climbers

Figure 5.9 Developmental changes may partially account for less frequent use of school playground equipment at about 7-8 years.

The relationship of play equipment to motor development should also be viewed from other perspectives (see Figure 5.10). In order for equipment such as swings and climbing apparatus to optimally serve young children and promote motor development, that equipment must be sized appropriately to the children's body measures and their developmental status or skill level. For instance, if swings are too high off the ground, a young child cannot easily or safely mount and dismount the swing. If the steps of a slide or climbing structure are too far apart or the handrailing too high, again the child will be dissuaded from ready and safe use.

Another important consideration is the provision for separate equipment and play spaces for younger and older children. As previously demonstrated, there are strong developmental differences between children of early and middle elementary school age. These differences can account for safety problems during parallel play. Provision for separate play areas for different aged children would seem to be important.

Finally, there is a strong need to explore all the presumed relationships and benefits from swings, slides, and climbing equipment. Such research evidence of either positive, negative, or neutral effects by play equipment on children's physical, social, cognitive, and affective development is needed to better substantiate the need for playgrounds as they now exist at America's elementary schools (see Figure 5.10).

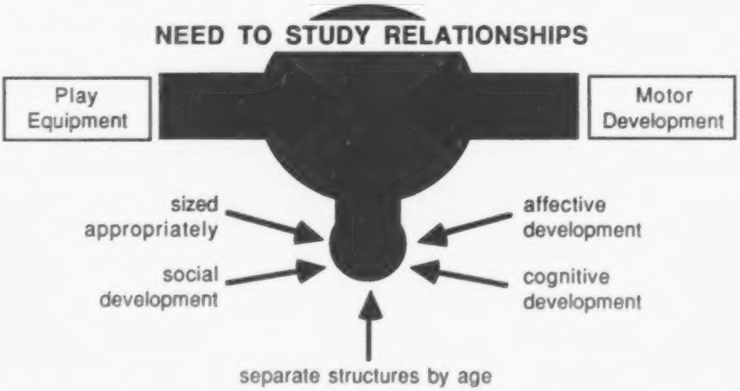


Figure 5.10 More research is needed to explore the relationship between play equipment use, motor development and several other perspectives.

In concordance with the need for research, a playground survey project was undertaken by COP. The following sections consider the methods, results and implications of this project.

Method

The National Survey of Elementary School Playground Equipment Project was accomplished by a group of 34 trained volunteer playground observers who rated 206 different elementary school playgrounds in over 20 states in the continental United States. These observers used the National Elementary School Equipment Survey instrument specially prepared for dissemination at a workshop held at the American Alliance for Health, Physical Education, Recreation, and Dance National Conference in Atlanta in 1985. Comparisons between and within raters established that the data were reliable and raters were objective. The data was gathered, tabulated, and summarized by Bowers and displayed by Bruya to include the percentages that are presented in Chapter 3. That information is used in preparing the following summaries and discussions.

Swings - Data Summary

Swings were the second most prevalent piece of playground equipment found on the 206 playgrounds in this survey. Of the 3,070 total pieces of equipment observed, 397 were swinging pieces of equipment. This represented 12.9% of all playground equipment observed in the survey. On an average, the observers saw almost two (1.92) swings or swing structures per playground surveyed. Swings are highly visible traditional pieces of playground equipment on elementary school playgrounds.

Swinging structures provided over six (6.3) swing seats per playground in this survey. The average distance between swings was 26 inches. Of those swing structures observed only 15% had seats made of metal or wood and only 5% were of the swivel type design. Virtually all the swing structures observed (99%) were securely anchored in the ground. At least 65% of the moving parts of swing structures were rated by observers as being in good working condition and not in danger of breaking. At least 74% of the swings did not have sharp points or edges. Swings appeared to be popular on our elementary school playgrounds and in general are firmly anchored, made of non-wood or metal seats, and 2 of 3 are in good repair and without sharp corners or edges.

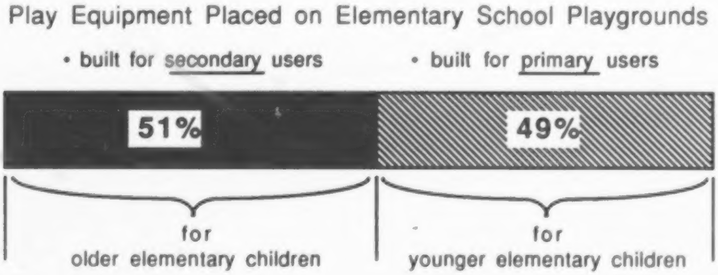


Figure 5.11 Traditional playground equipments were most often purchased and placed in commission to meet the needs of older children who probably had less interest in them (Crum and Eckert, 1985) than the younger children who are the most frequent users of the playground equipment.

Conversely, 51% of the play areas were not thought to accommodate the primary users, young children (see Figure 5.11). Of those school playgrounds which did provide swings for younger children, only half (50%) placed the swinging structures for younger children on a separate structure from other swings. Even more serious and impressive was the observation that 94% of the areas provided no barriers to discourage children from running directly into swings which were in motion.

Three other areas of concern also should be noted in relation to swings. Where swing seats were supported with chains, most chains (91%) were not covered in any way to prevent pinch points. In addition, 26% of the swinging structures had sharp corners, edges, or projections on the swing seat, chains, or other parts that could cause injury. Almost 1/3 of all swings had a potential for breaking or were in poor condition. While swings appeared to have been in generally good shape there are some serious danger areas which need attention especially: 1) the separation of age groups, 2) construction of barriers which help to prevent impacts with moving swings, 3) protection of the pinch points on the chains, 4) removal of swings in poor repair, and 5) designs which do not permit sharp edges and corners (see Figure 5.12).

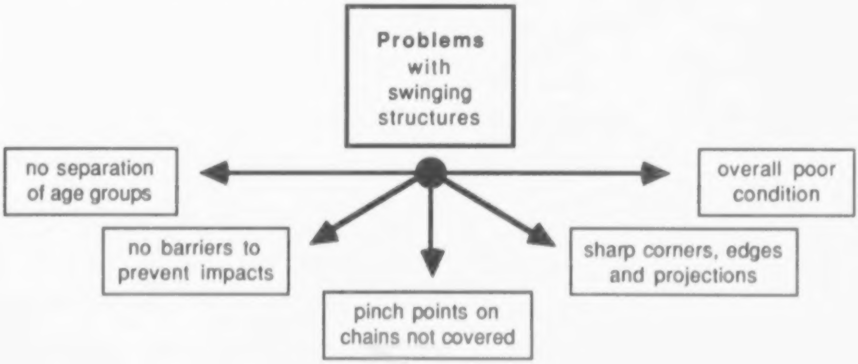
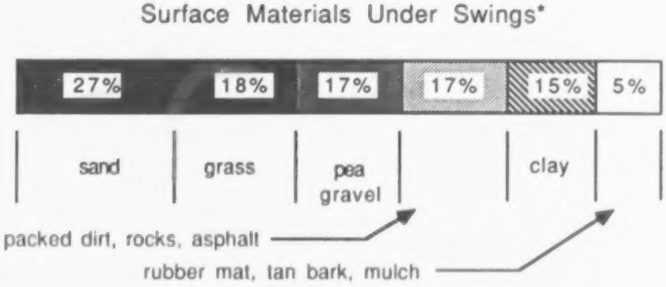

Problems with swinging structures
no separation of age groups
overall poor condition
no barriers to prevent impacts
sharp corners, edges and projections
pinch points on chains not covered

Figure 5.12 Several recurring problems exist with swing structures on our elementary school playgrounds.

In addition to the forementioned areas of concern, there is also the subject of surfaces beneath the swing structures. This area was highlighted by the USCPSC (1980b) as an important factor in injuries due to falls. The surface material most often used under swings in this Survey was sand (27%). Next in popularity were grass (18%), pea gravel (17%), and clay (15%). Other surfaces under swings observed in less than 10% of the surveyed playgrounds included hard packed dirt (9%), hard packed rocks (4%), asphalt (4%), rubber matting (2%), tan bark (2%), and mulch (1%). Thus, approximately 49%, or less than half, of all swings had an appropriate type of force absorbing surface under them (i.e., sand, pea gravel, or rubber matting). The majority of surfaces were conducive to injury from falls. Unfortunately, no indication of depth of surface was called for by the instrument. Thus, depth of surface was not assessed (see Figure 5.13).



*Numbers do not add up to 100% due to rounding error.

Figure 5.13 Less than half had surfaces under them that conformed to the spirit of the CSPC standards. No assessment was made as to the depth of the surface material.

Swings - Implications

Swings which were prevalent on all playgrounds appeared to be securely fastened in the ground and as such do not present a danger to children. It was clear that swing supports and frame components are well above the 18-inch minimum lateral clearance recommended by the USCPSC and that most of the swing seats were following the guidelines for lightweight materials to lessen impact injuries. While sharp corners, edges, and projections were observed only 26% of the time, they were still frequent enough to be concerned for the safety of the children who play on them.

Almost 3/4 of all swings were judged to be in good repair and not in danger of breaking. Although a minority of equipment (33%) existed in poor repair, the data suggests strongly that 1) someone needs to be officially in charge of inspecting equipment on a regular basis and 2) they need to be responsible for fixing or seeing that broken parts are fixed. The third responsibility of the person who holds the office of safety inspector may be to prevent children from playing on any broken equipment until it is repaired (see Figure 5.14).

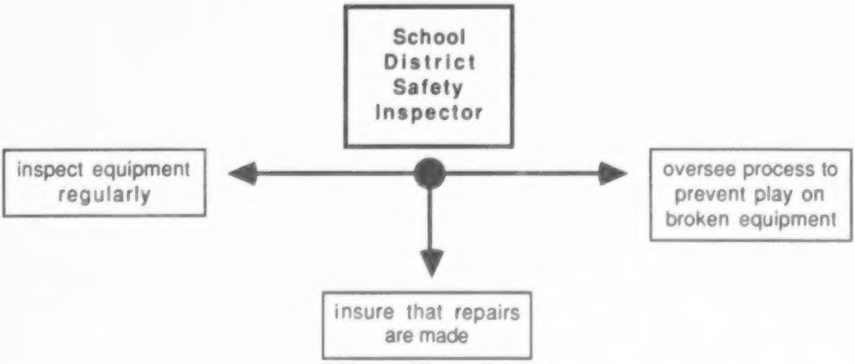

School District Safety Inspector
inspect equipment regularly
oversee process to prevent play on broken equipment
insure that repairs are made

Figure 5.14 It is obvious from the continued existence of broken equipment on our playgrounds that responsibility for repairs should be placed in the hands of a single competent safety inspector.

There apparently needs to be an emphasis on providing appropriately sized equipment for young children (e.g., lower swings, seats with sides, backs, and safety belts). Where swinging equipment exists, it should be physically separated from that designed for and used by older children. In addition, special emphasis in playground design should be given to developing barriers around swinging equipment to help insure that both those swinging and those waiting a turn are protected from the swing activity.

Surfaces under swings also must be given attention. It can be easily noticed on any playground that the area under swings receives an inordinate amount of wear. Usually there are mud- and water-filled depressions under most swings. Even when sand and pea gravel are placed under swinging areas, these materials are eroded quickly by children mounting, dismounting, and dragging their feet as they swing. Since over half (54%) of the surfaces under swings are hard material, the *USPSC's warning about injuries from falls and impacts due to swings must be heeded.* New materials such as rubber matting (which currently underlies only 2% of all swings) or artificial turf supported with rubber impact pad in sufficient thickness must be placed under existing and new swing equipment. As one final recommendation, chain supports should be covered to negate pinching.

It was noted under the **Safety** and **Developmental Play Considerations** section that swings can be both beneficial and dangerous depending upon how they are designed, maintained, and used. It seems obvious from the developmental and safety information that swings are most commonly used by and beneficial to younger children. Yet, fewer than half of the playgrounds provide swings for young children. An improperly designed swing area that allows youngsters to run through moving swings, mixes older and younger swing users, has improperly maintained equipment, hard packed under surfaces, and improper use by older children (e.g., climbing and standing on or jumping from swings) provides a negligent play environment. Unfortunately such situations appear to occur all too frequently on our elementary school playgrounds.

Sliding Equipment - Data Summary

Slides were the fourth most frequent piece of playground equipment on the 206 elementary school play yards included in this survey. Of the 3,070 total pieces of equipment observed, 300 pieces were sliding equipment. These 300 pieces represented almost

1/10th (9.8%) of all equipment. On the average, the results of the survey indicated at least one slide (1.45) per playground.

Slides are relatively common pieces of equipment on elementary school playgrounds. The average highest point of slides varied widely. One hundred and twenty slides, or 40%, were 8 feet to 9' 11" at their highest standing points. Ninety, or 30%, were at least 10 feet to 10' 11" high and thirty, or 10%, of all slides were at least 11 feet above the ground. Fortunately, 84% of the slides had some type of guardrail around the platform at this height (see Figure 5.15).

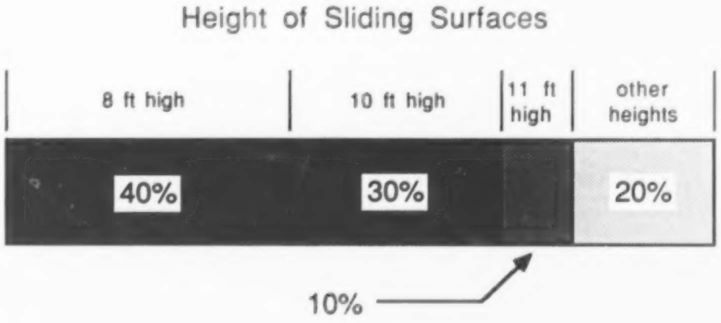
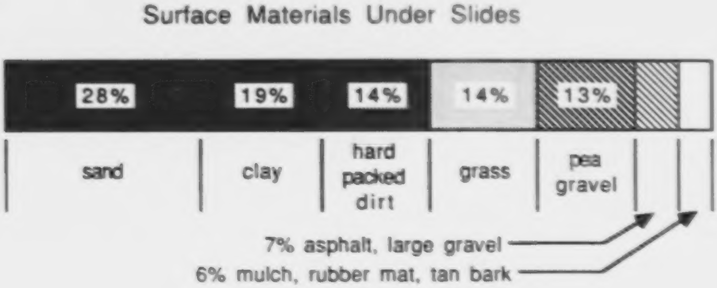


Figure 5.15 In light of injuries reported earlier concerning roughhousing...-78% (see Figure 5.2), these slide heights seem unnecessarily high.

Underlying slides were a variety of surfaces. The most frequently observed material was sand (28%). Following sand were clay (19%), hard packed dirt or grass (both 14%), and pea gravel (13%). Less frequently observed surface materials included asphalt (4%), large gravel (3%), mulch, tan bark, and rubber matting (all 2%). Thus, at least 44% of the surfaces under slides, 46% of which may extend to heights of 8 feet or more, would be some form of hard, non-force absorbing material which could exacerbate an injury due to a fall (see Figure 5.16).



* Numbers exceed 100% due to rounding error.

Figure 5.16 The force absorption material under slides should be sufficient to absorb the force of a fall especially since 40% are 8 feet high or higher.

On the whole, the slides observed were built and maintained as very stable structures. Most (88%) were firmly fixed into the ground and 71% were in good repair and at least 2/3 (66%) were without sharp corners, edges, or projections. The sliding surfaces were largely (82%) smooth with no protrusions along the length. In addition, 77% of the slides had a flattened angle at the bottom to cause deceleration of the child's movement before landing on the surface below the slide. The bottom end of the slide also was at last 13 inches above the surface, permitting children enough room to bend their knees and return to a standing position after leaving the slide (see Figure 5.17).

There were several design problems with the slides observed in the survey. The first two have already been noted: slides extended to relatively great heights and had hard surfaces under them. In addition, most slides (74%) were not wide enough to accommodate more than one child at a time. Thus, the equipment had to be used in a solitary fashion by all children, regardless of skill or age.

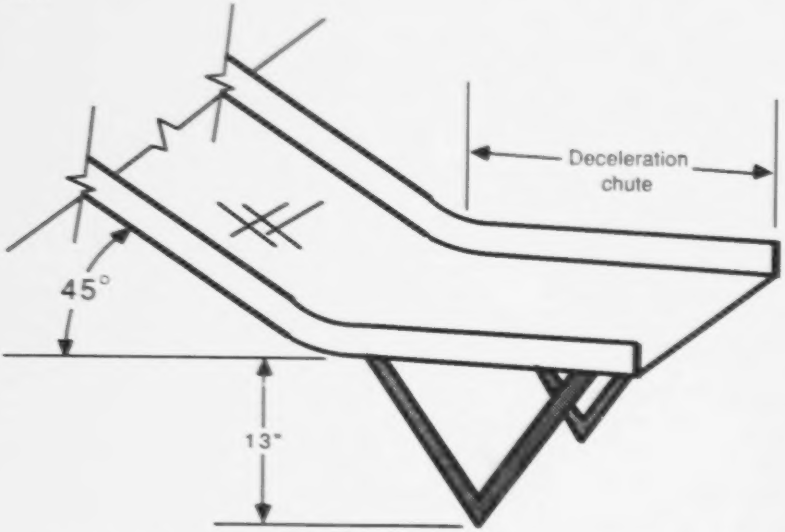


Figure 5.17 A deceleration chute at the bottom of the slide changes both the angle of contact with the ground and the speed of exit.

From a maintenance standpoint, almost 1/3 (29%) of the slides had broken or missing parts. Another 1/3 (34%) had sharp corners, projections or edges that could cut, lacerate, or otherwise injure users (see Figure 5.18).

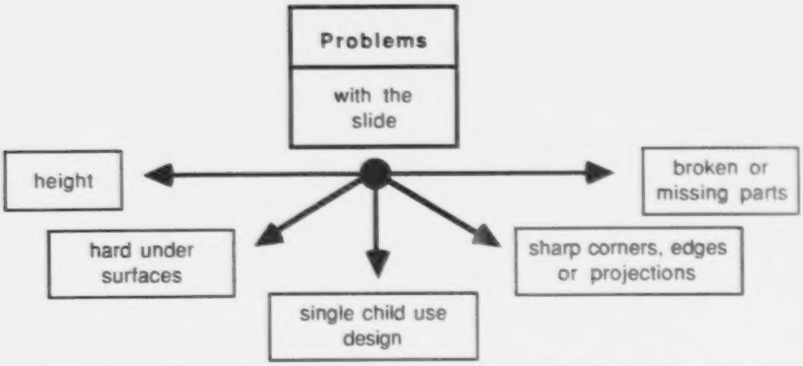


Figure 5.18 Several problems with slides have yet to be resolved on our elementary school playgrounds.

Sliding Equipment - Implications

Although sliding equipment in general appeared to be safe in design and maintenance, there were some concerns. The USCPSC (1980a) noted that, of all playground injuries reported in the 1978 study, over 16% of them were a result of injuries due to slide use. In that study, only 12% of the playground use was devoted to slides. Thus, slides received proportionately more injuries than their occurrence would suggest (see Figure 5.19). Of all slide injuries, 3/4 (78%) resulted from falls over the side or from the platform or ladder.

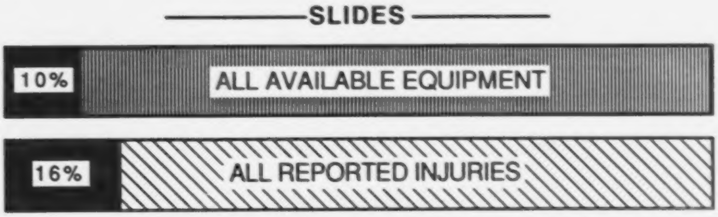


Figure 5.19 Slides account for a greater percentage of injuries (16%) that occur on playgrounds than they account for availability of equipment (12%) for use during play.

Like many injuries on swings, many of the occurrences resulted from "improper" use of equipment such as roughhousing, walking up or down the sliding surface, losing one's grip, slipping, or losing balance (USCPSC, 1980a). Fortunately, the rate of slide injuries has gradually declined over the years from the 25% of slide-related injuries in 1971-72 and 28% in 1974 to the 16% rate in 1978 (see Figure 5.20).

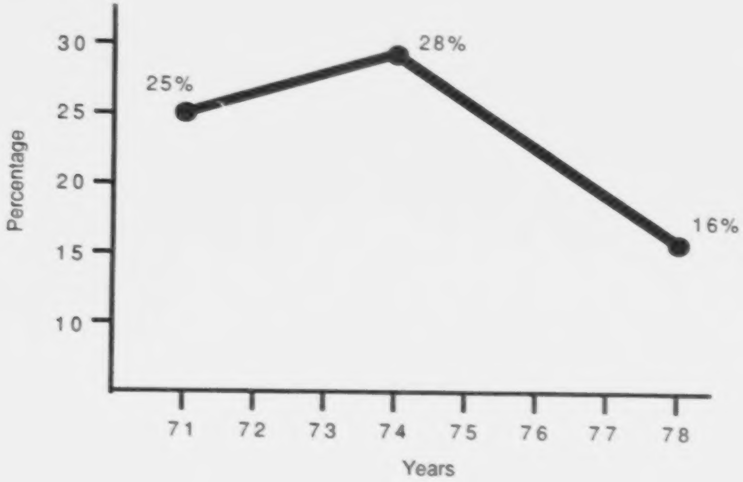


Figure 5.20 Injuries due to slide use have declined in recent years, although the sample may be too small to be indicative of a trend.

The combined results of the USCPSC studies and this survey strongly suggest the need to examine design and use of slide equipment. Despite the fact that slides seem well built, stable, and relatively well-maintained, they are still the source of proportionately high injury rates.

Two primary design factors are indicated as probable sources of injury: height and hard surface materials. The first factor could be mitigated by designing slides to fit the contours of hills or mounds and other surfaces which would eliminate the danger of falls without detracting from the exhilaration of accelerating down a slide. Where inclined ground surfaces do not exist, a platform arrangement beside the slide as Bowers (1979; in press) suggests in his work on the "Science of Design," or a force absorbing surface material under each to reduce the injuries from falls, is required. Materials such as rubber mattings and sufficient depths of artificial turf can provide such surfaces (1" of mat per 3' of structure height). In addition, supports and other bracing structures need to be padded and covered. Finally, design consideration for group play dictate sufficient railings on platforms and properly designed non-slip steps which reduce other causes for falls.

It is apparent that more attention to playground supervision through the education of play leaders and playground supervisors is needed to reduce the amount of dangerous and inappropriate use of slide equipment (Lowe, in press). With such attention, perhaps slide accidents and injuries can be reduced while increasing the rate of slide usage.

Climbing Equipment - Data Summary

Climbing equipment was the most frequently found piece of playground equipment on the school yards in the survey. Of the 3,070 pieces of observed equipment, 1983 pieces or 64.6% were climbing equipment. Climbers included such diverse numbers and types of equipment as 512 chinning bars (26% of all climbing equipment), 323 overhead ladders (16%), 281 fireman's poles (14%), 249 balance beams (13%), 240 monkey bars (12%), 152 parallel bars (8%), 109 geodesic dome climbers (5%), 38 suspension bridges (2%), 25 sets of overhead rings (1%), 21 various shaped climbers (1%), 15 tunnels (.7%), 13 vertical ladders (.7%) and 5 chain net climbers (.3%). On the average playground included in the survey, one would expect to see at least 8 climbing pieces of equipment (see Figure 5.21).

As could be expected from such a diverse set of equipment, maximum equipment heights varied greatly. Although the maximum climber heights averaged 9.3 feet above the level surface, 60% of the climbers ranged in maximum height from 9 feet to greater than 15 feet above the surface. At least 10% of climber heights exceeded 15 feet above the level surface.

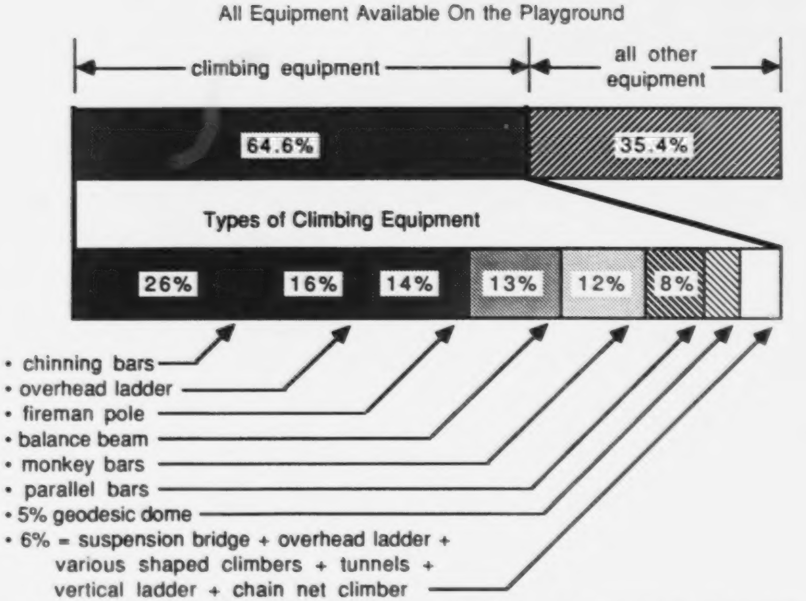


Figure 5.21 Climbing equipment makes up 64.6% of all available equipment on the playground. Many different types of equipment are a part of climbing equipment depending on function.

The diameter of hand and foot holds required to climb on the equipment was also considered. The average size of the hold diameters was 2.45 inches which exceeds the USCPSC standard guideline of 1.6 inches by almost an inch (see Figure 5.22).

Adding to the heights and hand hold problems associated with climbers was information about surfaces under the climbers. Surface materials included sand (24%), grass (19%), clay (18%), pea gravel (16%), and hard packed dirt (10%). Other less frequently used surfaces included asphalt (4%), mulch or tan bark (3%), rubber matting (3%), crushed rock (2%), and concrete (1%). This means that over 1/2 of all surfaces (53%) under climbers were hard and potentially dangerous in the case of a fall (see Figure 5.23).

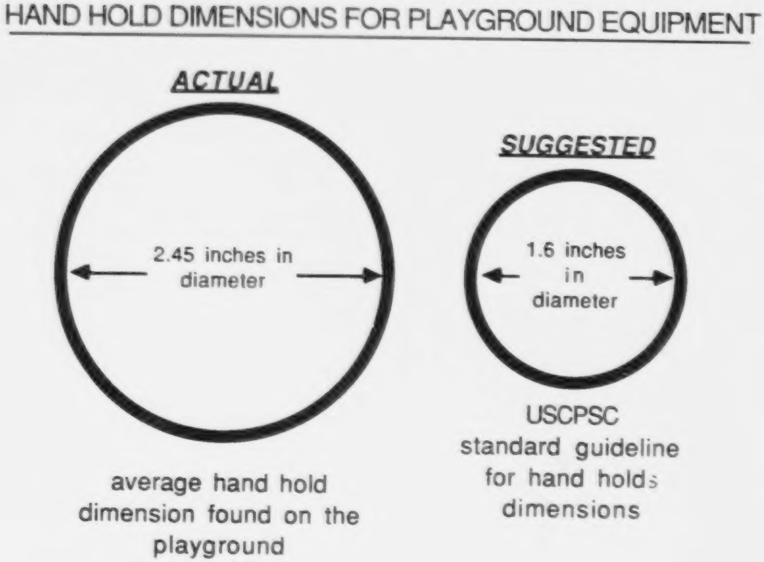

HAND HOLD DIMENSIONS FOR PLAYGROUND EQUIPMENT
ACTUAL
2.45 inches in diameter
average hand hold dimension found on the playground
SUGGESTED
1.6 inches in diameter
USCPSC standard guideline for hand holds dimensions

Figure 5.22 The dimensions of the suggested handhold size are exceeded by just less than 1 inch when measures of hand holds were made on the elementary school playgrounds assessed as a part of this study.

Climbing structures basically were very stable with 82% of all equipment securely fastened and 91% of all structural supports firmly fixed in the ground. About 2/3 of all equipment pieces (69%) were free of open holes that could trap fingers while 63% of the pieces limited horizontal openings to 7 to 11 inches to prevent head entrapment. Eighty-eight percent of V angles were wider than 7 inches also reducing the likelihood of limb, foot, or clothing entrapment in equipment.

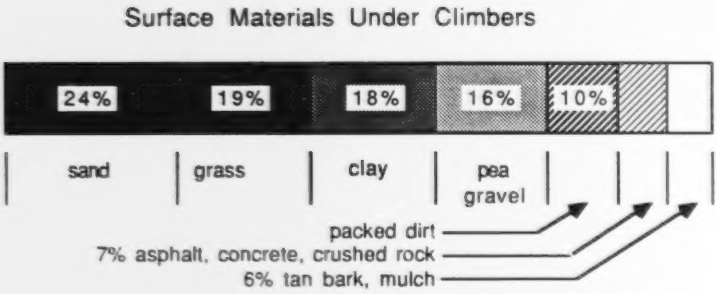


Figure 5.23 In excess of one third of all climbers were placed over dangerously hard surfaces.

However, an unusually high 41% of climbing equipment had sharp corners, edges, or projections, and approximately 1/3 of all climbers had open holes for finger entrapment or open horizontal spaces for head entrapment. Any of these could cause serious injury to children using the climbers.

Climbing Equipment - Implications

Climbing equipment represented the most frequently observed type of playground equipment in the survey. Because of the diversity of equipment placed within the climbing category, generalizations are difficult. As observed previously, most climbers were well supported and strongly attached to the ground. However, a great number of pieces had serious finger, hand, limb, head, and clothing entrapment areas or sharp edges, corners, and projections all of which could lead to serious injuries to the children using the climbers. In addition to these concerns, many of the pieces of climbing equipment (60%) were 9 feet or higher above the surfaces. Over 1/2 (54%) of these surfaces were hard materials that could exacerbate falls from the heights. Finally, the average diameter of climbing holds exceeded the recommended USCPSC guidelines by almost an inch.

All of these negative conditions conspire to produce injuries (see Figure 5.24). In fact, the 1978 USCSPC report suggested that 42% of all playground injuries were assigned to various climbing equipment. Although this injury rate was less than the equivalent percentage of climber use (51%) it was still too great.

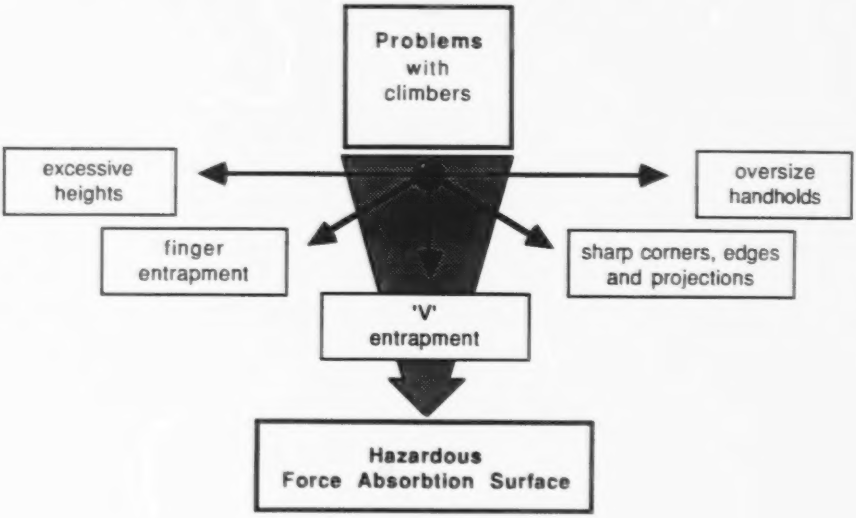


Figure 5.24 Several problems currently exist with climbing equipment on our elementary school playgrounds. These problems can lead to injury.

Obvious changes in climbing structure design would be to 1) reduce the heights of climbers, 2) remove entrapment areas, 3) scale handholds to fit children's hands, and 4) improve the amount and type of force absorbing surfaces under climbers. Since climbers have no USCPSC standards for maximum climber heights, as a default strategy it seems reasonable to adopt a similiar recommendation to the one for slides; a maximum height of 10-12 feet. Probably a more reasonable recommendation of 6-7 feet or even lower would be wise.

As with swings and slides, the use of new materials such as rubber matting and sufficient depths and resiliency of artificial turf backed with fall cushion under climbers would reduce the potential for serious injuries resulting from falls. In addition, strong and well-designed railings around climber heights and correctly sized handholds should be properly installed and sized to eliminate these sources of falls.

Adherence by equipment designers and builders to the existing USCPSC Guidelines (1980a) as a minimum is another obvious recommendation. It should also be noted that careful inspection and maintenance of climbing structures, along with trained play supervision of climbing equipment, will go a long way toward improving children's experiences and reducing injuries.

Summary and Recommendations

The playground equipment studied and evaluated in this chapter (i.e., swings, slides, and climbing equipment) represented the most frequently observed group of equipment on the playgrounds reported in the survey. In addition, according to the USCPSC (1980a), these equipment structures represent 83% of all playground use as well as produce 81% of all injuries (totals computed from a table listed on p. 3, 1980a). More than any other categories of equipment, swings, slides, and climbers represent the essence of traditional elementary school playground equipment.

The National Survey of Elementary School Playgrounds substantiated both the frequency of installation of swings, slides, and climbing structures and the general good design and construction which these pieces of equipment represent. A great majority of the pieces of equipment were physically sound and well-anchored in the ground. For the most part, they were free of major infirmities and serious design defects.

At the same time there were numerous instances of other safety defects such as sharp edges and projections, entrapment places, and pinch points. Of major concern were the physical problems related to lack of barriers around swings, the height of slides and climbing equipment, and the lack of force-absorbing surfaces under most pieces of equipment.

While these structures are the most frequent on elementary school playgrounds, the developmental resources (Crum & Eckert, 1985; Roberton & Halverson, 1984) sugggest that these equipment represent relatively rudimentary sources of environmental stimulation for children. Despite the varied types of equipment in each category which were represented in the survey, Crum and Eckert (1985) rated swings and climbers as promoting only "low organizational" activities. These apparently are types of equipment most frequently used by six-year-old-and-under females. For the most part, boys six-years-old and above chose activities with greater complexity, levels of organization, and larger peer groups (Crum & Eckert, 1985). Although standards for these play structures were critiqued by the USCPSC using minimum average five-year-old anthropometric measures, it appears that such equipment is developmentally most appropriate for children even younger than six years old.

These data present a double edged sword. Traditional swings, slides, and climbing structures are the most common and frequent types of equipment on our elementary school playgrounds. However, they also represent equipment whose activities are more appropriate for children younger than most who normally use the playground.

In addition, certain basic equipment designs and improper maintenance procedures put the users of the equipment at risk of injury due to falls and impacts from excessive heights and poor surface materials. The implications of these findings suggest the need to examine the value of traditional playground equipment more closely. The assumption that the designs of these play structures, as now found on our playgrounds, play an important role in cognitive, motor, or social development can be seriously questioned.

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CHAPTER 6

ROTATING, SPRING ROCKING, AND SEE SAW EQUIPMENT

by

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This chapter will focus on the results of Sections 7, 8, and 9 of the data collected using the National Elementary School Playground Equipment Survey instrument and on the implications for playground safety, play patterns, and child development based on those data. These sections deal with rotating equipment (Section 7), spring rocking equipment (Section 8), and see saw equipment (Section 9) on elementary school playgrounds (see Table 6.1).

For purposes of the survey and this report, rotating equipment included such items as "merry-go-rounds" and "swinging gates" which rotate around a center fulcrum. Spring rocking equipment were pieces fixed on a stationary post that permit either forward-backward, side-to-side or up-down motions due to a simple spring mechanism. See saw equipment included the traditional "see saw" (sometimes referred to as the "teeter totter") which is a beam acting as lever tilting around a center fulcrum.

Table 6.1 Sections 7-8-9 of the survey instrument.

National Elementary School Playground Equipment Survey
Sections 7 - 8 - 9

Section 7 - Rotating equipment (merry-go-rounds, swinging gates)
Based on 44 pieces of equipment on 206 playgrounds

Section 8 - Spring rocking equipment
Based on 33 pieces of equipment on 206 playgrounds

Section 9 - See saw equipment
Based on 183 pieces of equipment on 206 playgrounds

Safety Considerations

The United States Consumer Products Safety Commission (USCPSC) has issued warnings relative to the hazards associated with playground equipment (1980a). Merry-go-rounds, spring rockers, and seesaws were associated with over 11% of all available equipment to use while accounting for over 13% of all injuries (see Figure 6.1). The data cited in the following paragraphs was derived from a series of playground studies, in particular the December 1978 USCPSC Hazard Analysis (1979, p.3).

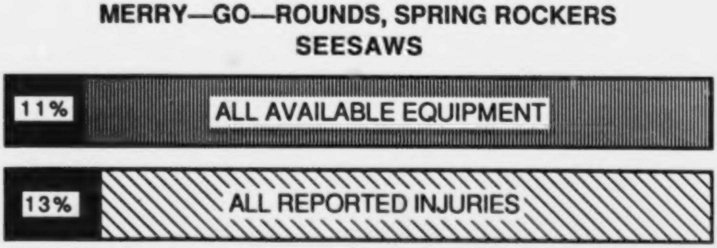

Figure 6.1 Merry—go—rounds, spring rockers and seesaw playground equipment account for a greater percentage of injuries (13%) that occur on playgrounds than they account for availability of equipment (11%) for use during play.

Specifically, the USCPSC reports that injuries associated with merry-go-rounds usually occurred as a result of falls from the moving equipment. Some children fell because they lost their grip while others were thrown from the equipment as a result of the speed of rotation (1980a, p. 4). Often the injury resulted from striking either the base of the merry-go-round or another object that was placed too close to the merry-go-round exit space. Other children were injured while pushing the merry-go-round and were struck as the device whirled around (USCPSC, 1980a, p.4).

The vast majority of injuries from the use of see saws resulted from falls from the equipment, although one of six injuries did result from being struck by the moving see saw. Injuries other than falls often resulted from negligent maintenance such as punctures from slivers or other cuts and lacerations from poorly maintained or damaged wooden see saws (USCPSC, 1980a, p.4).

Injuries from spring rocking toys were due to falls from that equipment in over half of the cases. Other injuries resulted from pinches by the springs or cuts and lacerations from poorly maintained equipment USCPSC, 1980a, p.4).

The results of the USCPSC Hazard Analysis (1979) would thus suggest that the gravest danger from moveable equipment seems to be from falls from the equipment or being struck by the equipment when it's in motion. In the first case, careful placement of equipment and attention to force absorption surfaces as a means of preventing injury is indicated by the USCPSC. In the second instance, proper supervision seems to be in order for reducing such injuries (see Figure 6.2).

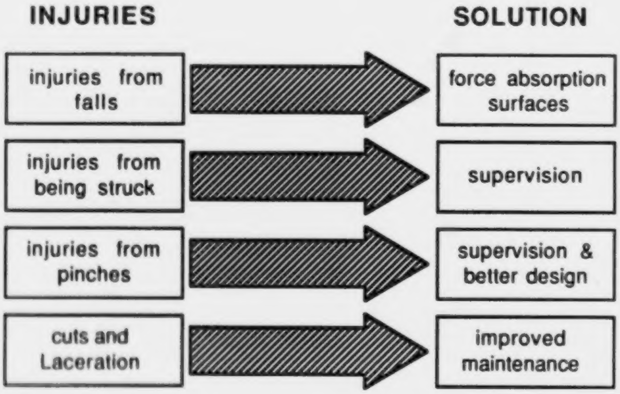

Figure 6.2 The incidence of injuries which occur most frequently on merry—go—rounds, spring rockers and see saws can be decreased if adult care takers act to reduce them.

Developmental Play Considerations

The equipment in the sections being reported represented the primary movable types of equipment, aside from swings, present on most elementary school playgrounds. Movable equipment is that which provides motion independent of, in addition to, or as a result of the child's movement. In contrast, other playground equipment is stationary and requires the child to do all the moving. The equipment described in the current chapter, therefore, provides movement and an environment for play more conducive to "open skill" development (Gentile, 1972; Poulton, 1957). According to Gentile (1972), open skills represent movements that occur in a constantly changing and moving environment. Typical stationary pieces of playground equipment foster movements which can be termed "closed skills," which occur in more stable and unchanging environments and require no movement external to the mover.

The implications for the open-closed skill division, according to Gentile (1972), are that open skills require the mover to more carefully monitor the environment than the mover in the closed skill environment. Because of this need for constant monitoring, open skills can be viewed as more complex. Crum and Eckert (1985) observed that there are significant age and sex differences in how children perform on complex motor skills such as those required by apparatus-like playground equipment. The moving equipment such as merry-go-rounds, rocking toys, and teeter totters, therefore, can provide important sources of movement and perceptual challenge to children as they develop (see Figure 6.3). Properly constructed and maintained, these moving equipment can permit both young and older children to practice open skills at their own levels of movement competence.

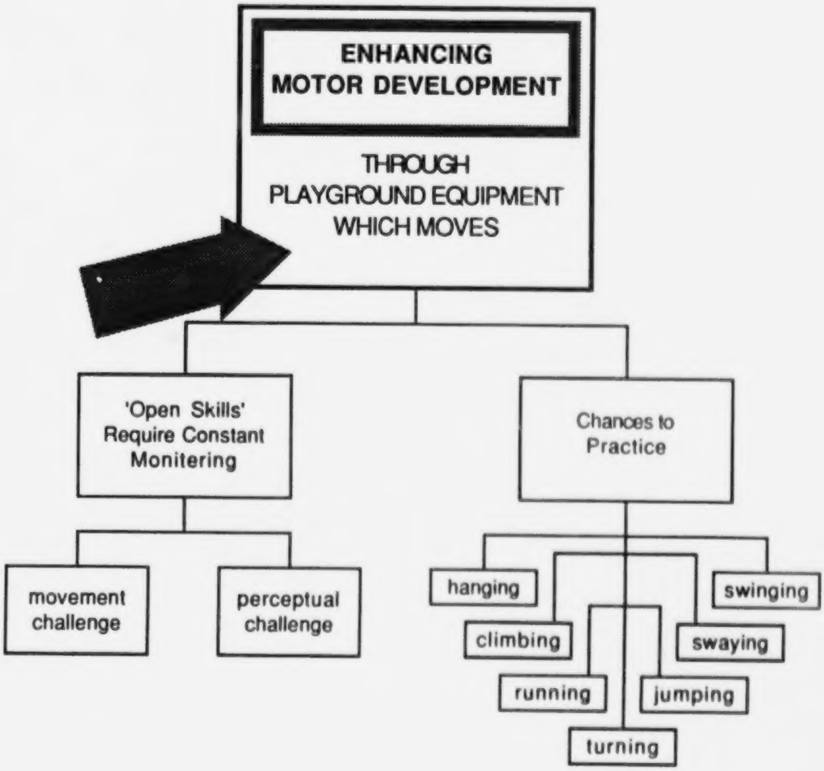

Figure 6.3 Playground equipment that moves can assist in motor development.

This movable equipment also may be important to young children in enhancing sensory-perceptual, cognitive, and motor development, especially as a source of vestibular stimulation. Young children function differently on perceptual, cognitive, and motor levels than do adults (Roberton & Halverson, 1984). They particularly have need for environments which both support and challenge their existing levels of development in order to impel the developmental process known as "equilibration" (see Figure6.4).

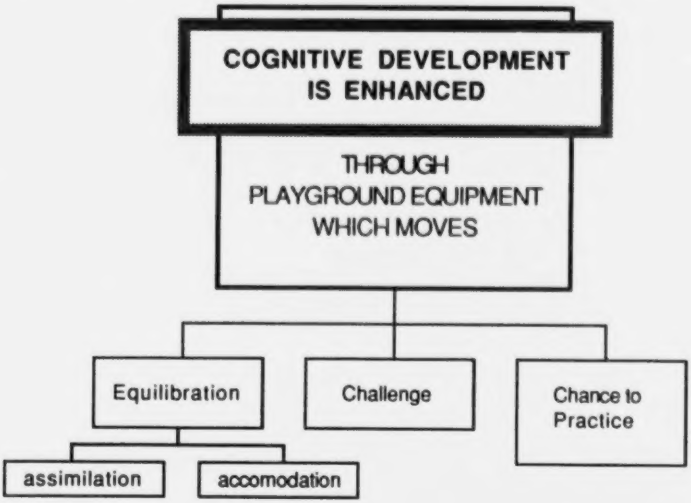
COGNITIVE DEVELOPMENT IS ENHANCED
THROUGH PLAYGROUND EQUIPMENT WHICH MOVES
Equilibration
Challenge
Chance to Practice
assimilation
accomodation

Figure 6.4 Chances to work through a cognitive strategy to solve problems related to performance can be provided through moving playground equipment.

For example, children from ages 2 to 7 years are strongly animistic and egocentric in their cognitive development. On one hand, playground equipment allows preschool children to "act out" and reinforce (i.e. assimilate) their imaginary situations or animism by providing stimuli for that play. A merry-go-round may become a spinning fantasy carriage; rocking equipment becomes a real horse in a race; or a see saw may simulate flying, or a pump jack in the well behind their house.

At the same time, while the playground equipment permits the child to assimilate his/her animistic fantasies, the presence of other children competing for the use of limited pieces of equipment may require the normally egocentric child to practice sharing and taking turns with other playground users. In addition, moving equipment such as merry-go-round and see saws require careful cooperative behavior by children in order for the equipment to be used properly (see Figure 6.5). Such turn-taking and cooperation requires practice, and can encourage accommodation of more advanced levels of psychosocial development (Roberton & Halverson, 1984).

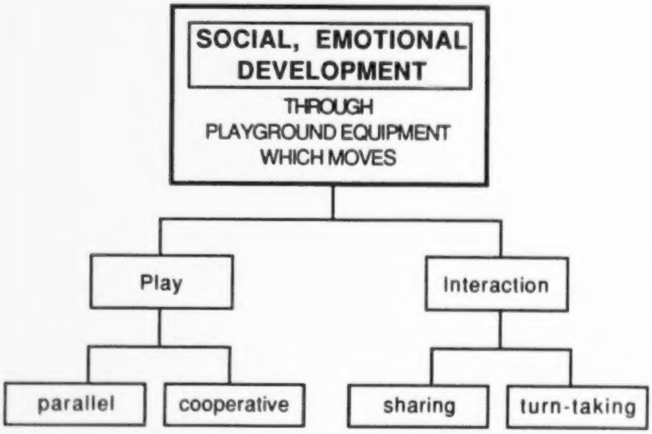
SOCIAL, EMOTIONAL DEVELOPMENT
THROUGH PLAYGROUND EQUIPMENT WHICH MOVES
Play
Interaction
parallel
cooperative
sharing
turn-taking

Figure 6.5 The use of moveable equipment on the playground can provide the opportunity for social and emotional growth.

Playground equipment also may provide important stimuli for encouraging perceptual development. Young children need opportunities for improving their ability to attend to relevant stimuli, increasing discrimination of stimuli, and enhancing intersensory integration (Roberton & Halverson, 1984). A playground environment, particularly one with moving equipment pieces, provides situations in which the young child must concentrate on the demands of climbing on (and staying on) a revolving merry-go-round, discriminating the appropriate length of a see saw for balancing two children, or integrating postural and visual cues while riding atop a wildly swaying rocking toy (see Figure 6.6). Such enhanced perceptual functioning can be crucial to steady improvement in cognitive and motoric development.

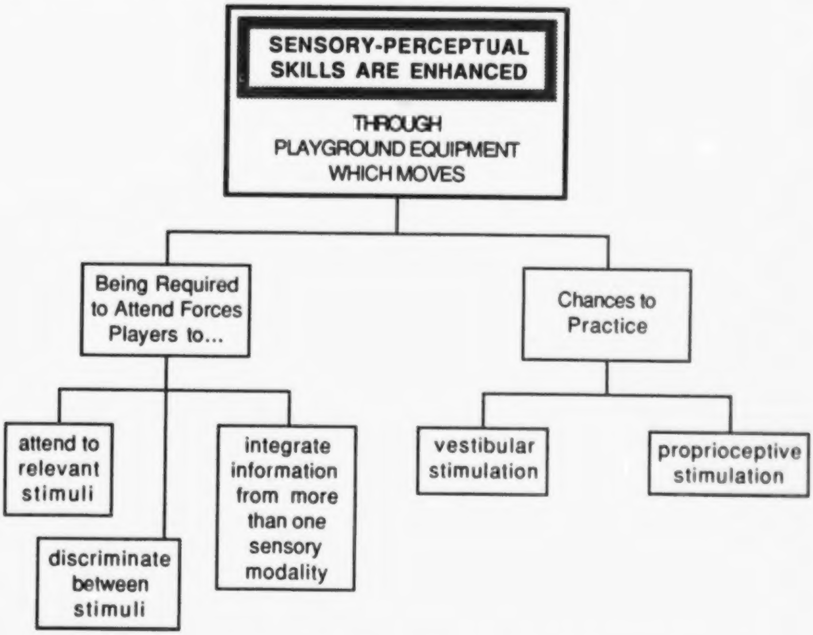
SENSORY-PERCEPTUAL SKILLS ARE ENHANCED
THROUGH PLAYGROUND EQUIPMENT WHICH MOVES
Being Required to Attend Forces Players to...
Chances to Practice
attend to relevant stimuli
discriminate between stimuli
integrate information from more than one sensory modality
vestibular stimulation
proprioceptive stimulation

Figure 6.6 Sensory perceptual skills can be enhanced through the use of playground equipment which moves.

The development of vestibular and proprioceptive perception appears to be important in general motor development (Clark, Kreutzberg, & Chee, 1977). Stimulation of vestibular sensation occurs as a result of head acceleration in the horizontal, vertical, or diagonal planes (in line with the three semicircular canals of each inner ear). Obviously, rotating, moving, rocking, and teetering equipment provide particularly important sources for such stimulation to the young child. In particular, rapidly revolving merry-go-rounds appear to provide high degrees of angular acceleration which children seem to find especially stimulating and exhilirating.

The particular motor skills which moving playground equipment facilitate have been classified as low- and medium-organization activities and apparatus skills (Crum & Eckert, 1985). Such activities and skills include climbing, hanging, jumping, running, spinning, swaying, and turning. These occur both individually and in combination. The development of these types of movements are ones not stressed in traditional physical education, youth sports, and movement programs. Therefore, playground equipment may play an important role in providing opportunities for young children to practice such skills. Motor development experts, in shunning the traditional "maturational" causal assumptions for changing movement, are stressing the importance of broad-based, but specific, practice situations for young children (Roberton, 1984; Roberton & Halverson, 1984). Optimal developmental rates of change seem to occur for children who regularly are experiencing and interacting with appropriately challenging movement environments. Playground equipment can provide one important source for that necessary stimulation.

Methods

The results of the survey were based on 206 completed surveys from 34 trained volunteers in 23 states. The volunteers were trained at a workshop and seminar at the Atlanta, Georgia AAHPERD-AALR Meeting held in 1985. Reid and Bruya (1985) have described the reliability of the instrument and objectivity of the raters (see Bowers), both of which were at sufficiently high levels to insure confidence in the data. The raw data was compiled and translated into the pecentages and group means which are presented here and elsewhere in the report.

Rotating Equipment — Data Summary

There were 44 total pieces of rotating equipment on the 206 separate elementary school playgrounds assessed. This translates into a rotating piece of equipment like a merry-go-round or swinging gate on approximately one in every five (21%) elementary school playgrounds surveyed. Rotating equipment, however, represent only approximately 1.4% of the total pieces of equipment observed in the survey. Thus, rotating equipment like merry-go-rounds represent a relatively small proportion of all equipment available to elementary school-aged children on their school playgrounds. In terms of an important source of vestibular and motor stimulation as cited above, most elementary school playgrounds appear to provide few opportunities.

The volunteer playground assessors observed that 39 of 44 supporting structures of merry-go-rounds, or 89%, were firmly affixed in the ground. They also observed that 74% of the merry-go-rounds were securely fastened at their joints. Most of this equipment was safe from coming loose during actual operation by children.

On the other hand, almost half (47%) of the merry-go-rounds and other rotating equipment had sharp corners, edges, or projections and over half (53%) had open areas near or around the rotation post in which a child's limb could be trapped and injured during equipment operation. Also, only 38% of the merry-go-rounds had at least a 20 foot "safety" perimeter of running space for entering and exiting the revolving equipment.

Finally, it was important to note that surface materials under rotating equipment varied widely. A third (32%) of the pieces of rotating equipment had either concrete, asphalt, or hard-packed dirt under them. Another third (32%) had grass, clay, or sand under the equipment while only 21% had mulch, tan bark, or rubber mattings, while 19% had some type of gravel.

Surface Materials Under Rotating Equipment*

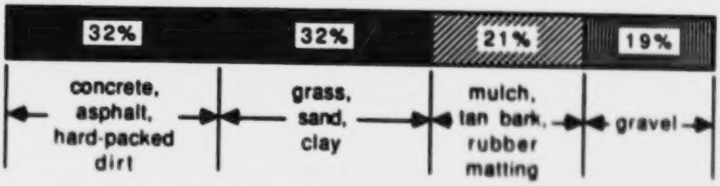

Figure 6.7 The force absorbtion materials under rotating equipment should be sufficient to provide safe impact with the ground should the child fall during play.

*Numbers do not add up to 100% due to rounding error.

Rotating Equipment—Implications

Based on these observations, it is evident that rotating equipment in the sample could cause both minor and major injuries to young children who attempt to play on them. The U. S. Consumer Product Safety Commission's A Handbook for Public Playground Safety indicates that merry-go-rounds were often associated with injuries due to falls and blows from the moving equipment. The lack of perimeter running space could contribute to the tendency for receiving blows from such moving equipment. The existence of poor surface materials such as concrete, asphalt, and hard-packed dirt also potentially could exacerbate any injuries due to falls. Finally, the poor design or maintenance of merry-go-rounds that permit openings in which limbs can become trapped or through which children can fall is a major hazard against which the USCPSC Handbook: Vol. II, (1980b) expressly warns consumers.

The safety hazards of rotating equipment are matched by the potential perceptual, learning, and developmental deficits that children may experience as a result of injuries or threat of injuries on improper and unsafe equipment. If a child cannot play and move with confidence on a piece of equipment due to memory of a past injury or due to observation of another child who became injured, then the child will most likely move tentatively and cautiously without the freedom from fear which movement should provide (Roberton, 1984). The tentative or fearful mover cannot progress naturally and achieve the level of development or skill with which he or she is capable. In addition, it was observed above that the relative lack of rotating equipment on playgrounds further negates any positive effects which children may gain even if it is designed, constructed, and maintained for safety of use.

Spring Rocking - Data Summary

Section 8 of the survey addressed spring rocking equipment. On the 206 elementary school playgrounds, 84 individual pieces of rocking equipment were observed. This represented a rocking piece on 41% of all elementary playgrounds, but only 2.7% of all equipment pieces observed. While more common than merry-go-rounds, spring rocking equipment accounts for a relatively small pecentage of playground equipment available on elementary school playgrounds. As such, it probably plays a minor role in beneficially enhancing children's development.

The safety evaluation of rockers was more positive than with rotating equipment. Observers noted that 86% of the structural supports were firmly fixed to the ground; 93% of the equipment was in good repair with all parts present and 83% had joints and fasteners secure. It was also reported that 82% of the seating surfaces were lower than 30 inches from the ground; 74% had two 3 inch handholds; 78% had footrests of sufficient size (4 X 6 inches).

However, 24%, or one in every four pieces, did have a sharp corner, edge, or protrusion that could injure a rider. The spring action on 38% of the equipment was exposed in such a way that fingers could be pinched or crushed by the action of the rocker. As with the rotating equipment, surface materials under the rockers was varied in type. Thirty percent were some type of gravel; 24% sand; 23% of the surfaces were either concrete, asphalt, or hardpacked dirt; 17% were grass; 3% rubber matting; and 3% tan bark (see Figure6.8).

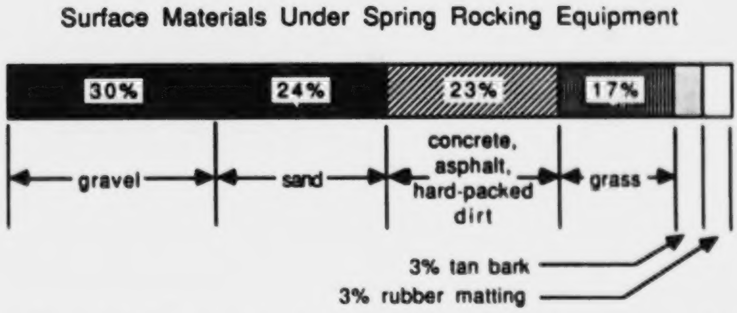

Figure 6.8 Almost one fourth of all spring rocking equipment observed were placed over dangerously hard surfaces.

Spring Rocking Equipment - Implications

While the safety features of rocking equipment were generally good, there were some definite hazards in violation of the USCPSC Handbooks: Vol. 1 & 2 guidelines (1980a; 1980b). It did appear that children were unlikely to be injured because the rocker either moved from its mounting or a piece separated during operation. However, it appeared very likely that children could be lacerated or punctured from sharp pieces and fingers could be injured by being caught in the spring mechanism. Despite the fact that most rockers conformed to the standard 30 inch or less height from the ground, almost one-fourth of the rockers was situated over dangerously hard surfaces (see Figure 6.8) which would have the effect of accentuating an injury from a fall.

The potential role of spring rocking equipment for development of children in the elementary school during play is probably minimal. The types of actions that the pieces of equipment facilitate are limited to climbing and bouncing as well as maintenance of postural control movements associated with swaying. Since the motion on many rockers is limited, little challenge is presented except for the smallest children. Imaginary play and bouncing are the most pronounced play and movement possibilities for spring rockers.

See Saw Equipment - Data Summary

Next to swinging equipment, see saws were the most common type of moving play equipment observed on the sample playgrounds. On the 206 playgrounds, 183 see saws were observed; this indicated that an average of 89% of all playgrounds had see saws .

See saws represented 6% of the total equipment pieces observed in this sample.

Unfortunately, the potential safety hazards associated with see saws were numerous, partially due to their inherent nature and the design and partially due to improper maintenance. While 93% of the see saws were firmly affixed to the ground, almost one-third (30%) had joints or fastenings which were insecure. Over half (53%) of the see saws had sharp corners, edges, or projections and most (84%) permitted body parts to pass underneath the equipment during its action. In only 14% of the cases was there provision for shock absorption or cushioning of impact with the ground and over half (51%) of all see saws were constructed such that fingers could be pinched or crushed during operation. Approximately half (55%) of all see saws observed had the required two 3 inch handholds at each end. The average seat height which a see saw could reach was 3.8 feet (or approximately 46").

Underneath the see saws was an amazing variety of dangerous surfaces (see Figure 6.9) including concrete and asphalt (11%), hard rocks (10%), and roots and rocks (8%). Thus, a total of 29% of all see saws were placed over extremely hard surfaces. Other surface materials included grass (21%), pea gravel (18%), clay or sand (14% each), and mulch or rubber matting (4%).

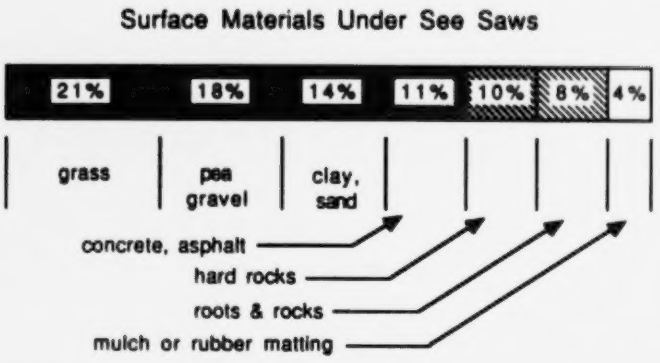

Figure 6.9 An amazing variety of unsafe surfaces were observed under see saw equipment.

See Saw Equipment - Implications

The see saw or "teeter totter" represents perhaps the most complex piece of moving equipment on the playground since its normal operation requires the cooperation of at least two persons, usually young children. As summarized earlier in the **Developmental Play Considerations** section, young children are characterized by their egocentrism and general rudimentary social and motor skills (Roberton & Halverson, 1984). The cooperative demands of a see saw easily challenge even the most advanced young child. It is difficult for the young child to recognize the potential plunge to the ground if, suddenly "captured" by another interesting event, they abruptly get off when their end is on the ground. They often will not appreciate in advance the potential head, neck, back, or other injuries that can occur from a body dropping almost 4 feet onto any surface, regardless of its texture and composition.

When the complexity for cooperation and movement is coupled with the incredibly poor safety features observed with teeter totters, the situation is ripe for disaster. Because of the average height of see saw travel, the lack of cushioning, and the hard surfaces under them, injuries of varying severity due to falls are almost guaranteed. In addition, poor maintenance and design enhance the chances for blows, lacerations, and punctures coming from the moving see saw.

As observed earlier, the see saw provides an ideal environment for cooperative play by two or more children as well as vestibular and postural stimulation and motor development of climbing, rocking, jumping, and bouncing activities. Unfortunately, these positive aspects of the equipment cannot be facilitated in the face of such negligent design, construction, and maintenance procedures associated with see saws.

Summary and Recommendations

The data from the moving equipment observed in Sections 7, 8, and 9 of the National Elementary School Playground Equipment Survey is most disturbing. There were numerous, and in some cases, majority, instances of extremely serious safety hazards present for merry-go-rounds, spring rockers, and see saws. Of particular concern across all pieces of equipment was the presence of sharp corners, edges, or protrusions as well as situations where body parts could be pinched, crushed, or otherwise entangled in the moving parts of the equipment. In addition, the surface materials under all pieces of equipment were varied and usually inadequate to absorb force from falls. Also, the equipment and the play spaces around merry-go-rounds and see saws were designed such that youngsters moving on or through the area could receive blows from the moving equipment.

It was previously summarized that moving equipment of the kind dsecribed in these sections can provide important sources of challenge and stimulation to young children in their psychosocial, perceptual, cognitive, and motor development (see Figure 6.10). In particular, because these pieces of equipment involve movement and cooperative play, they provide a source of stimulation to development not presented in other pieces of playground equipment or in other movement settings. Thus, it was interpreted that these pieces as a part of contemporary playground, can play an important role in supporting the development of players who use them.

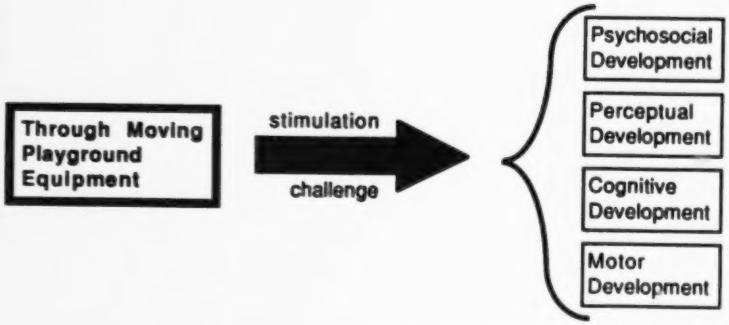

Figure 6.10 Moving equipment on our playgrounds can support the total development of the children who play on them provided that safety is adequately dealt with through good design, construction and maintenance programs.

Because of the safety hazards observed, there may be a call from some to abolish these offending pieces of equipment. But, abolition is probably inappropriate. Children need the kinds of vestibular, motor, and social stimulation provided by moving equipment. It is likely that they will seek such stimulation in less safe environments and under more hazardous conditions than presently observed if playgrounds do not provide it.

One alternative resolution to banning these pieces seems plain and obvious. We must begin designing, constructing, and maintaining our playgrounds in more safety-conscious ways. Manufacturers need to pay close attention to the United States Consumer Product Safety Commission's Handbooks: Vol 1 & 2 (1980a; 1980b) as well as do more field testing of products. They must also be cognizant of the needs and uses that children make of their equipment. Playground construction companies and other individuals charged with building facilities also must use the USCPSC handbooks. Finally, owners and supervisors of playgrounds must plan and carry out careful maintenance and repair programs for their facilities. There also is a need for further study of additional elementary and public playgrounds. Continued monitoring of playgrounds in this country will provide the information on whether the warnings issued in this report are being heeded and corrections and improvements undertaken.

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CHAPTER 7

SAND AREA, WADING AREA, AND SIGNS, TREES & PATHWAYS

by

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Although the National Elementary School Playground Equipment Survey has provided a great deal of new information concerning the status of playgrounds in our nation, most educators and/or parents could have told the reader that play with sand and water on our schoolyard playgrounds is often neglected. They also would indicate that, for the most part, signs, trees or pathways used by wheel toys are not found on many of our elementary school playgrounds. But, even though many caregivers realize that these elements of a playground are frequently missing, few seem to have stopped to reflect on the implications this oversight might have on the development of the children who play on the playground.

This chapter will focus on the results and implications of sections 10, 11, and 12 of the National Elementary School Playground Equipment Survey instrument or the status of sand, water, signs, trees and pathways on our playgrounds. Section 10 deals with sand areas, Section 11 deals with water areas while Section 12 deals with signs, trees and pathways on elementary school playgrounds (see Table 7.1).

Table 7.1 In this chapter of the manuscript sections 10,11, and 12 will be discussed and implications drawn.

National Elementary School Playground Equipment Survey
Sections 10-11-12

Section 10 - Sand Play Areas
Based on 41 sand play areas on 206 playgrounds

Section 11 - Wading or water play areas
Based on 32 water play areas on 206 playgrounds

Section 12 - Signs, Trees & Pathways
Based on surveys of 206 playgrounds

For purposes of this report, sand play areas (see Figure 7.1) include sand pits constructed of wooden or tire borders (Frost & Campbell, 1985, p. 91; Bengtsson, 1970, p. 182; Stone, 1970, p. 43; Dattner, 1969; Heseltine & Holborn, 1987, pp. 135-137), bordered areas made of vertical 12x12's (Friedberg, 1975, p. 109; Plantinga, 1977, p. 21) or 2x12's (Hogan, 1970, p. 61), horizontal landscape timbers bolted and strapped together at the corners (Hogan, 1982, p. 180) and sand tables (Gordon, 1972, p. 33-34; Lindberg & Swedlow, 1980, p. 83).

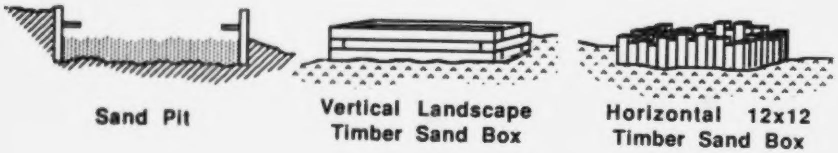

Sand Pit **Vertical Landscape Timber Sand Box** **Horizontal 12x12 Timber Sand Box**

Figure 7.1 Three types of sand play areas found frequently on playground are shown.

Water play areas or wading pools include shallow amounts of water (Maxim, 1985, p. 171) (see Figure 7.2) contained in pit-like areas in which children might play (Frost & Klein, 1979, p. 241; Singer & Singer, 1977, p. 156; Home & Massey, 1970), artificial water fall structures usually constructed of troughs (Friedberg, 1975, p. 103; PLAE Inc., 1986, p. 243), canal like structures used to play with small manipulatives (Hogan, 1982, p. 271; Dattner, 1969, p. 80), water sluices or cascades (Gordon, 1972, p. 37; Hogan, 1982, p. 167; Heseltine & Holborn, 1987, p. 155; PLAE Inc., 1986, p. 243), sprinklers (Dattner, 1969, p. 80; PLAE Inc., 1986, p. 244), water wheels (Heseltine & Holborn, 1987, p. 154), and water tables (Gordon, 1972, p. 36 & 39-41; Gordon, 1969, p. 33-38; PLAE Inc., 1986, p. 255). Small manipulative toys are often used in water and sand play. Also, tables or benches Sometimes are built into the play area and used as small staging areas for their constructive play (Dattner, 1969, p. 81; Stone, 1970, p. 43; Bengtsson, 1970,p. 182 & 186; PLAE Inc., 1986, p. 251 & 254).

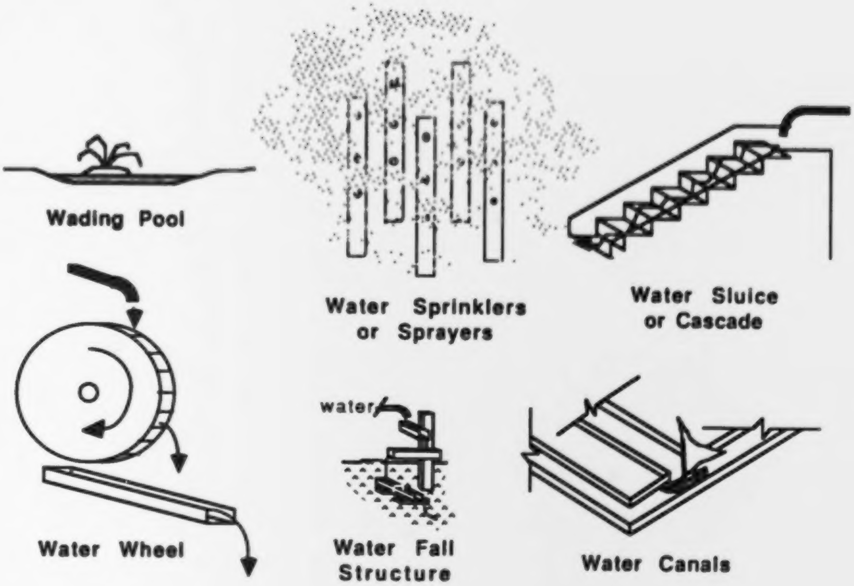


Figure 7.2 Water play areas come in many types of structures. Each allows the use of water in play in a different way.

Signs are used for caution and to provide curriculum ideas for children. They are positioned on the perimeter of the structure or attached to the structure itself near the play events. Trees on the playground serve as 1) equipment used by children for climbing, as 2) a holding area for play structures, and as 3) shade producing structures. Pathways on the playground consist of 1) routes between structures, 2) routes on the structure, or 3) routes across the playground made of hard surfaces upon which wheel toys may be used.

Safety Considerations

The safety hazards associated with sand and water areas and with hard paths developed for wheel toys are really very different than the safety hazards discussed for other pieces of equipment (e.g. see Langendorfer, Chapter 6). In fact, injuries associated with these areas occured so infrequently that they were recorded in a category entitled "unknown manner in which injuries occured" category (USCPSC, 1980).

Data concerning playground injuries reveals that 94% of all injuries occur on pieces of equipment other than those in which sand, wading or water play and hard paths are included (USCPSC, 1980). This would indicate that these areas are not frequently involved in injuries which occur on the playground either because they are inherrently safer or because there are so few of these structures in existence that the rate of injury is lower due to lack of availability. Actually, only 73 pieces of sand and water play equipment were found from a possible 3,070 pieces described by the survey as in existance on the sample population of playgrounds (n=206). This figure accounts for 2% of the total number of available structures (see Figure 7.3)

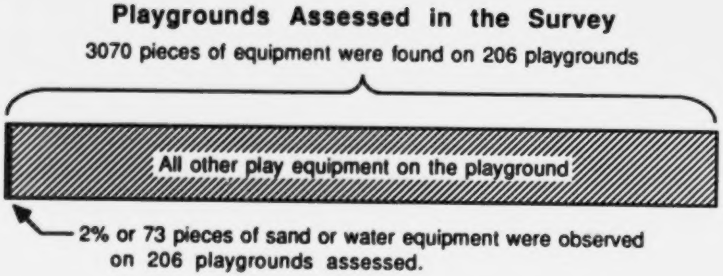

Playgrounds Assessed in the Survey
3070 pieces of equipment were found on 206 playgrounds
All other play equipment on the playground
2% or 73 pieces of sand or water equipment were observed on 206 playgrounds assessed.

Figure 7.3 Water and sand play areas made up a very small percentage of the total available equipment on the playgrounds surveyed.

Injuries are possible and probably do occur within and on sand and water play areas. Specifically, the sand area can harbor insects and/or disease. Careful maintenance procedures must be used (Hurtwood, 1968; Maxim, 1985, PLAE Inc., 1986, p. 247) to "eliminate insects, animal excrement and other trash or litter such as broken glass, nails, metal tabs from cans, pencils or other sharp objects which can be concealed by loose material" (USCPSC, 1980, p.5).

Wading or water play areas also can involve injuries or even death. If the depth of the water is not controlled well or if water is left standing when unattended by an adult, then play could lead to death by drowning. As Green suggests in her review of Danish playgrounds (see Green, in press), a well designed water play area included in a play setting for children should be drained each night.

For hard paths used with wheel toys, the danger of injury is different from those mentioned for sand and wading areas. Injuries from falls occur when sand or water find their way onto the path traveled by wheel toys. Sand or gravel can act as if ball bearings cover the path. Water can make the path slippery and difficult to keep one's balance. However, both of these problems can easily be solved if the hard path areas are designed to be kept separate from the sand and water areas.

Although the equipment cited in this chapter do not account for a major portion of the injuries which occur on the play ground, they can present formidable problems. Proper supervision associated with good design and maintenance would seem to present the best protection against injuries which might occur in these areas (see Figure 7.4).

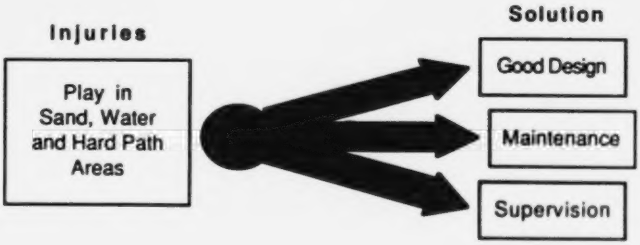


Figure 7.4 Incidents of injury which could occur in sand, water and on hard paths can be prevented if the necessary steps are taken to do so.

Developmental Play Considerations

For the playground setting, and particularly in the instance of sand and water, the activities engaged in during play can be considered to support general development (Heseltine & Holborn, 1987; Fernie, 1985; Noren—Bjorn, 1982; Hendrick, 1980; Butler, Gotts & Quinsenberry, 1978; Garvey, 1977; Sutton-Smith, 1971; Curry, 1971; Hill, 1984; Chowdhry, 1984). Child Development experts, play structure designers and educators of young children, specifically define the contributions of play in many of the aspects of development (Frost & Klein, 1979; Friedberg, 1975; Hutt, 1966; Brunner & Sherwood, 1976; Levenstein, 1976; Grief, 1976; Leacock, 1971; Herron and Sutton-Smith, 1971; Dansky & Silverman, 1973; Hart & Sheehan, 1986).

Sand Play. For the case of sand play "younger children spend most of their time in pouring the sand from one container to another... [they are] content for long periods... completely absorbed in the task" (Parten, 1971, p. 91). The experience of sand on a playground is considered to be a rich source of experience; one in which adult thoughts and intuitions are probably based (Insulander, 1982).

As a source of interest, the sand area compares favorably with all other play equipment available to children. On a creative playground, second grade children spent 6.3% of their time playing in the sand (Frost & Campbell, 1985). In another study the sand play area accounted for 3.83% of all observations when sand was a part of a contemporary linked structure (Frost & Strickland, 1985). Sand play proved to be heaviest with children in the first grade (4.42%), while less frequent for children in Kindergarten (1.59%) and second grade (1.01%) (Frost & Srickland, 1985).

However, when considering play for toddlers, sand proves to be a very significant material indeed. Observations made on a regular observation schedule indicate toddlers in a play setting will select sand play 22.0% of the time (Winter, 1985). This observation demonstrates that younger children generally spend more time occupied in sand play than older children. Female toddlers (55.8% of all observations of sand play) spend slightly more of their time in sand play than did male toddlers (44.2% of all observations of sand play). In essence, these findings suggest that the inclusion of sand on playgrounds designed for preschoolers is essential but may not be as important when children grow older. By the time children reach second grade, the rate of use drops to slightly more than 1% of all users (Frost & Strickland, 1985).

But when children use the sand play area on a playground the information gained during play can contribute to all or most forms of development. As referenced in an early playground construction text by Friedberg (1975), three categories used to outline the contribution of sand to the play patterns of children and ultimately to the total development of children are 1) physical development, 2) social development, and 3) cognitive development (see Figure 7.5).

Activities Matrix ● total ○ partial	sand	water
Physical		
jumping	●	○
crawling	○	
Social		
interaction	●	○
participation	●	●
role playing	●	●
cooperation	●	●
Cognitive		
manipulation	○	○
problem solving	●	●
choosing		○
interpretation	●	●

Figure 7.5 The activity matrix indicates how the development of the child can be supported by play in sand and water areas (after Freidberg, 1975, p.12).

Physical Development. Physical development which is supported by play is probably best described as including movements associated with climbing a ladder (Staniford, 1979, p.15; McIntyre, Bruya, Eubank, & Jackson, 1982), jumping from a structure (Bowers, 1979, 1977), using other locomotor patterns (Roberton and Halverson, 1984; Crum and Eckert, 1985), landing, and collapsing in a surface material which is protective and force absorbing (Beckwith, 1981, p.18-19). Sand is a safe surface if used in 6-8 inch depths (USCPSC, 1980; Heseltine & Holborn, 1987, p.178) and absorbs the force of an impact from a fall over larger areas (it conforms to the shape of the object falling into it) and a longer period of time when compared to other surfaces. This is the reason that so often sand is recommended as a safety surface under a structure (Beckwith, 1979;

Beckwith, 1983; Beckwith, 1985; USCPSC, 1980; PLAE Inc., 1986, p.247) as well as recommended for use in a sandbox play area.

But observations of sand play areas also indicate that crawling and quadrapedal locomotions of other types (e.g. creeping, bear walk) also are used frequently. For its part, sand is providing the medium through which children take weight on their upper shoulder girdle and in this way gain strength needed for daily activity.

Sand provides the opportunity for activities of a gross as well as a fine motor development nature. It is a utilitarian material which provides children the opportunity to jump, run, hop and leap safely while it also encourages pouring, construction, packing and other manipulative activities (Parten, 1971, p. 91). In essence, sand "...provides opportunities for a child to engage in a full range of play behaviors from the simplest to most complex forms" (Winters, 1985, p. 137). It is the source of balance between equipment which provides gross motor opportunities and the need for fine motor manipulation.

Social Development. Play activity also supports social development (Parten, 1932; Van Alystyne, 1932; Shure, 1963; Iwanaga, 1973; Barnes, 1971; Rubin, Maconi & Hornung, 1976; Westland & Knight, 1982; Crum and Eckert, 1985) or possibly even all social acts e.g. interaction patterns between people, role playing (Lewis, 1979, p. 23). Social development can be encouraged during play with sand since children are usually actively employed with sand in the same general vicinity as other children. Although little social interaction may take place at any given time (Parton, 1971, p. 91), the nature of the material and the flexibility of its use can easily encourage proximal play patterns in which the children play near one another but not necessarily together (Winters, 1985, p. 133). However, relational play patterns, in which verbal and non verbal modes of communication take place and in which children join together in common activity are also frequently observed (Frost & Klein, 1979, p. 239).

One such example of social interaction was observed by Herron & Sutton-Smith (1971) when they reported the construction of miniature roads and buildings in the sand area. Frequently these construction activities can be cooperative in nature (Friedberg, 1975) and controlled with language (Garvey, 1979) although they can also be of a parallel play nature (Herron & Sutton-Smith, 1971, p.95; Hurtwood, 1968; Caplan & Caplan, 1973).

Role playing is one additional social development activity which is often supported in sand play (Friedberg, 1975; Malloy, 1978). When children construct miniature examples of real life towns (Lindberg & Swedlow, 1980, p.84) or situations and assume the role of mother, father, fireman or police office (Schwartzman, 1979, p.251), they are described as being actively involved in sociodramatic play (Smilansky, 1968; Smilansky, 1971; Curry, 1974; Eriksen, 1985). During these periods some theorists would suggest that children are learning to adjust to the world as it exists (Ellis, 1973; Levey, 1978; Norbeck, 1979, Moore, 1985, p.171).

Cognitive Development. Cognitive development in children can also be supported during play (Barnett, 1979; Roberton and Halverson, 1984; Eriksen, 1985) if provision for the presence of sand play is made on the playground (see Figure 7.4). The most obvious manner in which cognitive development is supported is through exploration activity (Collard, 1979; Hutt, 1966, 1970a, 1970b, 1979), imagination (Singer & Singer, 1977, p.197) and problem solving situations (Herron & Sutton-Smith, 1971; Simon & Smith, 1985; Sylva, Brunner & Genova, 1976).

Problem solving in the sand box "is most easily seen when a child is provided . . . materials to make basic changes in the plan of the playground" (Friedberg, 1975, p. 7). The problem solving process can be construed to be a creative process since children may be "altering the environment to provide a wider variety of experiences" (Friedberg, 1975, p. 7).

It is obvious that cognitive concepts associated with weight and balance are supported by play with sand materials (Frost & Klein, 1979, p. 239). This is especially true when small loose pieces of equipment are available for use with the sand. Pouring, packing and constructing shapes using forms are examples of activities which support cognitive development (Parten, 1971, p. 91; Singer & Singer, 1977, p.156; Stone, 1970, pp. 28-29; PLAE Inc., 1986, p.247).

Water Play. Water play areas contain many of the features of sand play areas. For the developmental reasons expressed above, water like sand should be included on the playground. This is especially true since studies have shown that water on the playground is the second most significant and popular event (Home & Massey, 1970; Bright, 1962). However, the type of structures used to encourage water play are different from those used to encourage sand play. In most cases water play equipment looks like a pool used for wading (Frost & Klein, 1979, p. 211, 241), a structure which replicates a water fall (see Figure 7.6), a series of canals (Bengtsson, 1970, p.35,184; Dattner, 1969, p.96) as in Venice, Italy (see Figure 7.7), or a slooped amphitheater with spray or sprinkler poles (Hurtwood, 1968, p.37; Bright, 1962; Stone, 1970, p.66-67) as in the work of Burnett and Garrett Inc. on the Martin Luther King Playground (Frost & Klein, 1979, p. 193) .

Much like sand in its ability to hold children's interest, play with water can be completely absorbing and/or enchanting (Bengtsson, 1970, p.185). Water also can support development in physical, social, and cognitive areas (see figure 7.5).

Many authors who have written concerning the advantages of water and/or sand have considered them separately as well as used together (Friedberg, 1975; Heseltine & Holborn, 1987; Hewes, 1974; Hogan, 1982). When present together, sand and water seem to take on a synergistic quality (Hewes, 1974, p.146; Bengtsson, 1970, p.182; see Figure 7.6). With increasing amounts of water, sand will flow and in so doing create new and unique forms (PLAE Inc., 1986, p.235). With increasing amounts of sand added to a volume of water, it "models [can be shaped] more effectively thus increasing the . . . textural and creative advantages of the two . . ." used separately (Heseltine & Holborn, 1987, p. 141).

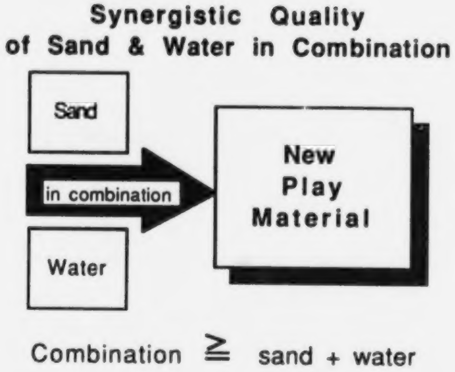


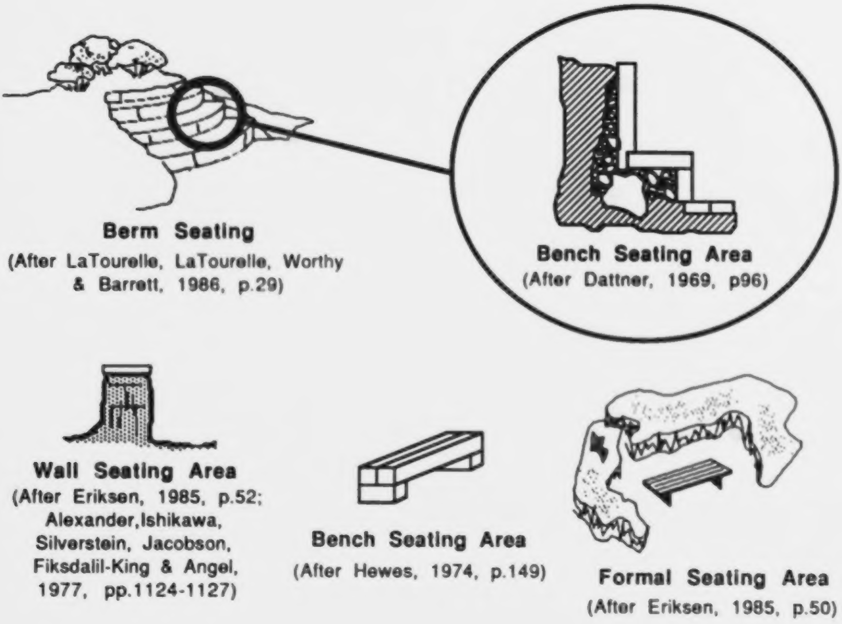
Figure 7.6 When water and sand are combined on the playground the result is an entirely new material to play with which is more absorbing for children than either of the materials used by itself.

Because the resultant mixture of water and sand provides a totally absorbing play material the provision for adult seating (Singer & Singer, 1977, p.154) adjacent to the water/sand area can be extremely important (Winter, 1982) and must not be ignored (Canadian Council on Children and Youth, 1980, p.5). Only through this provision will adults find it easy to monitor play on the playground (Texas State Department of Public Welfare [Texas], 1976, p.29), and particularly play in water areas were standing water could become a hazard to safe play.

In many instances adult caretakers can interact with children and materials involved in the play setting to facilitate the likelihood of learning and development (Bruya, 1985a; Beckwith, 1981, p.18; Smilansky, 1971, p.39). Frost and Klein (1979) have written that "parents and teachers share a critical role in fostering the development of play in handicapped [and all] children" (p. 239). But they must be sensitive and strive to understand when it is appropriate to intervene and when it is not (Woodward, 1984; Stone, 1970, p.47). Through adult suggestion and guidance children can be assisted in their play (Steele & Hrncir, 1985; Hurtwood, 1968, p.56). It is even possible that adult play leaders may better understand feelings through observation and participation in the play behaviors of children (Niosia, Willoughby, Hatcher & Nicosia, 1985; Segal & Adcock, 1982). Ultimately, some educators feel that parents and teachers may be able to improve preparation to work with young children and their play patterns and the benefits derived from play (Texas, 1976, p.9; Beckwith, 1981, p.18) if they become involved in the process of play themselves, with their children (Isenberg & Jacobs, 1982; Staniford, 1979, p.47; Sutton-Smith & Sutton-Smith, 1974, p.158).

The availability of adult seating in the general vicinity of the play areas for sand and water is probably important for at least two reasons. First, children who participate in water and sand play areas may need assistance to avoid potentially dangerous activities. Second, the developmental potential of sand and water play activities can be supported through careful guidance (Sylva, 1984, p.11) or "scaffolding" activities (Bruner, 1983).

Designs for sitting areas cover the full range of possibilities from berms, walls, and incidental seating areas to formally defined benches and structures (see Figure 7.7). Drawings of traditional bench structures are located in Friedberg (1975, p.114) and Hewes (1974, p. 149).



Berm Seating
(After LaTourelle, LaTourelle, Worthy & Barrett, 1986, p.29)

Bench Seating Area
(After Dattner, 1969, p96)

Wall Seating Area
(After Eriksen, 1985, p.52; Alexander, Ishikawa, Silverstein, Jacobson, Fiksdalil-King & Angel, 1977, pp.1124-1127)

Bench Seating Area
(After Hewes, 1974, p.149)

Formal Seating Area
(After Eriksen, 1985, p.50)

Figure 7.7 Seating areas for adult observers or supervisors can be important to the quality of play that takes place.

Signage. In recent years it has become more and more evident that signs are a source of information for both parents and players (PLAE Inc., 1986, p.110). Five categories of signage are evident (see Figure 7.8). The first four can be referenced to PLAE Inc. (1986, pp.110-116). The PLAE Inc. categories include 1) informational signs, 2) directional signs, 3) identification signs, and 4) regulatory signs. The fifth can be referenced to Big Toys equipment company (Schoolyard Big Toys, 1980). It includes curriculum signage.

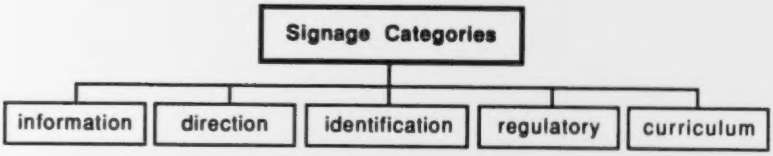
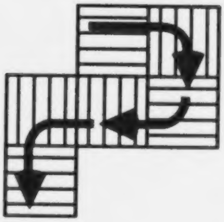


Figure 7.8 Signs on the playground can be classified in five basic categories.

Signs as Information. Signs which provide information to players or their adult caretakers are usually located at or near the most likely entrance to the play structure. These sign structures may provide an overview map of the play area with specific information concerning site organization and facility location (PLAE Inc., 1986, p.110). In addition informational signs may especially 1) locate accessible facilities, 2) describe accessibility levels, and 3) direct users to additional information (Nordhaus, Kantrowitz & Siembiender, 1984).

Signs of Direction. These signs function as traffic indicators. Frequently, they are used to trace pathways or playroutes (PLAE Inc., 1986, p.110) and may be located in the general vicinity of the structure and even on the structure itself (see Figure 7.9). When located in the form of an arrow on the play structure they can help children choose options (Robinette, 1985) and attempt new relationships between events.



(After LaTourelle, LaTourelle, Worthy & Barrett, 1986, p.51)

Figure 7.9 Directional Signage may appear on the structure to help players select routes or choose events.

Signs for Identification. Identification signs are particularly helpful as indicators of special features (PLAE Inc., 1986, p. 111). This is needed since person with physically handicapping conditions who use the play structure(s) should be aware of the level of accessibility a particular structure or part of a structure allows prior to entry. Signs of identification can also be helpful as an indication of difficulty and/or challenge. Usually color coding or medallions are used for this purpose (see Figure 7.10).

Medallions Placed on the Structure

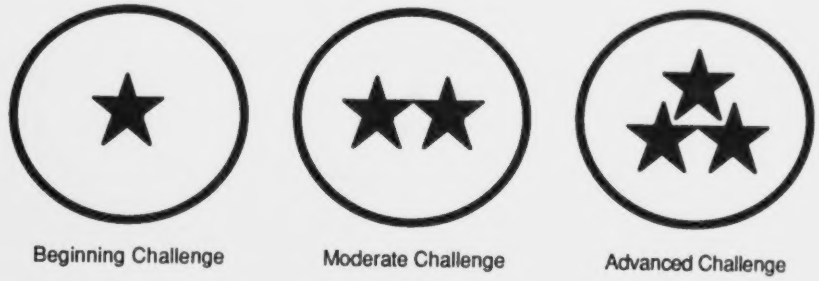


Figure 7.10 Medallions can be used to identify difficulty of the challenge on the structure (after PLAE Inc., 1986, p. 116 and LaTourelle, LaTourelle, Worthy & Barrett, 1986, p.60).

Regulatory Signs. Within the Consumer Product Safety Commission literature are some indications of ways in which children might play safely (USCPSC, 1978a,b,c,d,e,f,g). These materials have been used as one source of signage for the playground and are now available on the commercial market (Quality, 1987 and see Figure 7.11). They serve the function of cautioning and warning (PLAE Inc., 1986, p.111), and are coming to the forefront in the industry as a means of controlling risk of lawsuits which may occur as a result of injury on the playground (Bruya & Beckwith, 1985).

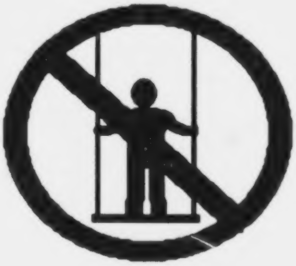


Figure 7.11 Regulatory signs of cautioning and warning are now offered as one way to help minimize exposure to risk (after Quality, 1986, p.1).

Signs as Curriculum. The curricular signage side of the sign concept is particularly important as a technique for increasing exploration and learning gained from participation on the structure (USCPSC, 1978g). Basically these forms of signage are attached directly to the structure and provide ideas for activities children might attempt. The concept is based on the task instructional technique which is used to expand ideas for activities, clarify play leader explanations and encourage exploration and learning as a result of play on the structure (Mosston, 1981). The task station technique used for curriculum signs on the playground relies heavily on the ability of students to read simple language and graphic illustrations (see Figure 7.12). Currently this type of task card signage is also available on the commercial market (Schoolyard Big Toys, 1980).

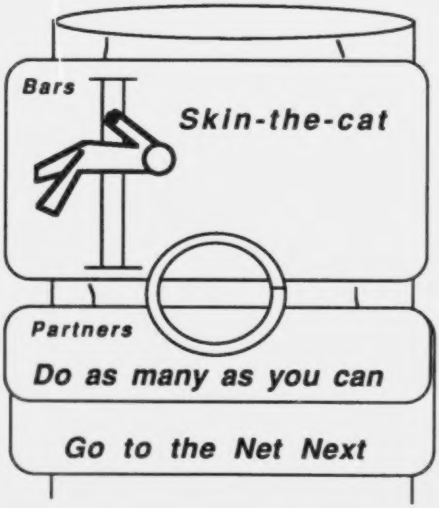

Bars
Skin-the-cat
Partners
Do as many as you can
Go to the Net Next

Figure 7.12 Curriculum signs can be mounted on the structure and changed to vary the tasks posed or to meet specific needs of children (after Schoolyard Big Toys, 1980).

Type and Readibility of Signs. In some settings it is important that posted signage be of a bilingual nature since peoples of different languages use the playground. In whichever language messages are presented, they must be simply stated and easy to read (first grade reading level will usually insure understanding of those who are able to read).

Graphic displays of information should accompany all presentations of necessary information (Nordhaus, Kantrowitz & Siembiender, 1984; PLAE Inc., 1986; p.113; Bruya & Beckwith, 1985). Clear bold graphic statements are quickest to transmit needed information. Specifications for letter and graphic sized, shapes and colors can be gained from PLAE Inc. (1986, pp.109-116).

Trees. Trees are used on the playground to achieve at least one of two desirable effects: 1) for use as a playstructure or 2) to provide provide protection from the weather. Each use has important implications for play behavior and the development of children.

From the concept of a tree as play equipment comes the ideas of 1) dead trees on the playground (Hewes, 1974, p.130), 2) trees used for climbing, and 3) trees used for tree houses (Stiles, 1979). The second consideration for a tree on the playground is to provide shade (Talbot, 1985) and wind protection (Chu & Topps, 1979, p.15 and Figure 7.13).

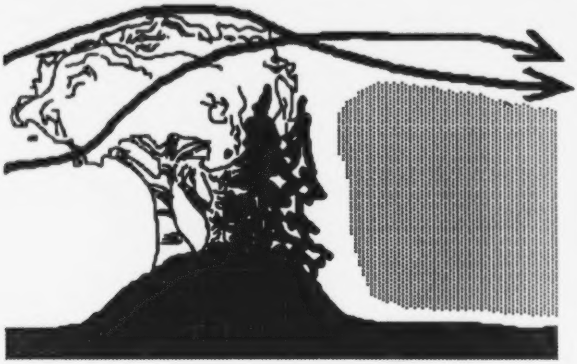


Figure 7.13 Trees on the playground can be valuable supports to the play of children since they can be used for shade and to break the prevailing wind (after Chu & Topps, 1979, p.15).

Tree as Play Equipment. The "build a playground for free" movement generated during the late 60's and early 70's used leftover or scrounged materials were frequently pressed into service (Hogan, 1974). Associated with the "build...for free" movement came the idea of using a dead tree imbedded in concrete as a climbing structure (Hurtwood, 1968, p.32; Bengtsson, 1970, p. 187; Stone, 1970, p.36 & 37; Dattner, 1969, p.101). To accomplish this, the main trunk and several of the larger branches would be trimmed to remove all breaks, sharp points or "V" entrapment areas.

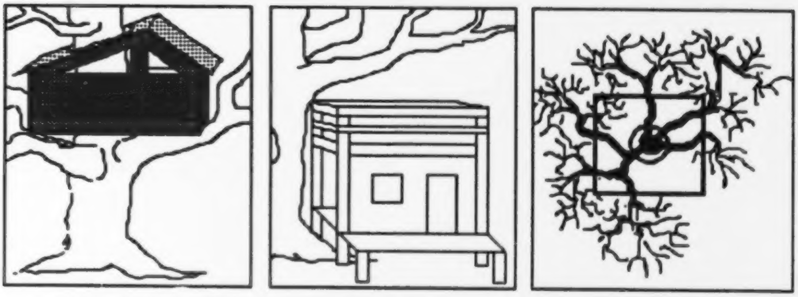
On the other hand, a living tree provides, then it is a natural place to climb, and if of the suitable type, will likely retain its structural integrity [yearly inspections of living trees is highly suggested (Mason, 1982, p.124)]. One disadvantage of living trees used as climbing structures is that branches may break off when children climb on them. Thus, it is important to determine if trees on the playground will withstand the play of children. The Quercus or

Oak trees and the Fraxinus or Ash trees are two of the most popular choices (Mason, 1982, p.12). Two of the trees most unsuitable for use on the playground are Betula or Birch and Fagus or Beech (Mason, 1982, p.123): both are susceptible to wood rot and may break under the load of children.

The danger of broken tree limbs can be minimized by attaching limbs from two different trees ". . . so that if a limb gives way, it will still be supported by another tree or limb and won't come crashing down" (Hewes, 1975, p. 131). If trees are configured at distances of between 5-20 meters as suggested in Mason (1982, p.87), then limb attachment for purposes of safety may be feasible.

Assuming a setting where children are allowed to climb the trees (Noren-Borg, 1982, p.20) a tree house may be a good idea for a play structure (Hogan, 1970, p.91). Hogan (1974, 1982) suggested that a tree house is a place filled with secrets; a special place where a child may go when he or she wishes to be alone (Singer & Singer, 1977, p.152). On a playground it can be a space to get away, to enjoy a conversation or to participate in some swashbuckling drama.

In addition to designs for tree house play structures (Friedberg, 1975; Hogan, 1974, 1982) suggestions are also offered concerning other forms of tree houses (Hogan, 1970, p.89). Structures built around trees or even tree house structures built without trees (Hogan, 1974, 1982; Hogan, 1970, p.88; Gordon, 1972, p.17) are suggested as good places for children to play (see Figure 7.14).



Side View
Tree house in the tree
(After Gordon, 1972,p 11)

Front View
Tree house under tree
(After Hogan, 1970, p91)

Top View
Tree House Around Tree
(After Hogan, 1970, p89)

Figure 7.14 The tree house concept has been expanded in the literature to include tree houses in the tree, tree houses under the tree, and tree houses around the tree.

Tree as Shade. The other need for trees is as a shade producing or wind protecting apparatus (Chu & Topps, 1979, p.13; Hurtwood, 1968, p.39). Shade trees are attractions on a hot afternoon and thus, provide a protective canopy under which children play.

Of course, shade becomes a most important consideration when the role of parents in the play of children is considered. Parents, teachers or play leaders sometimes interact with children and can support development and learning. Children develop and learn while playing and parents assist through guidance and gentle intervention which can be offered from the shaded observation area. However, if shade is not available during observation periods the likelihood of parents remaining in the area to interact during play is lessened.

If shade trees exist on/or in the vicinity of the play structure, they can be thought to ". . . frame, shade and beautify" (Talbot, 1985, p. 246). The frame and beautify function of trees include several basic tree arrangements (Alexander, Ishikawa, Silverstein, Jacobson,

Fiksdalil-King & Angel,1977, pp.797-800). These are 1) umbrella, 2) pair, 3) avenue, 4) courtyard, 5) grove and 6) orchard (see Figure 7.15).

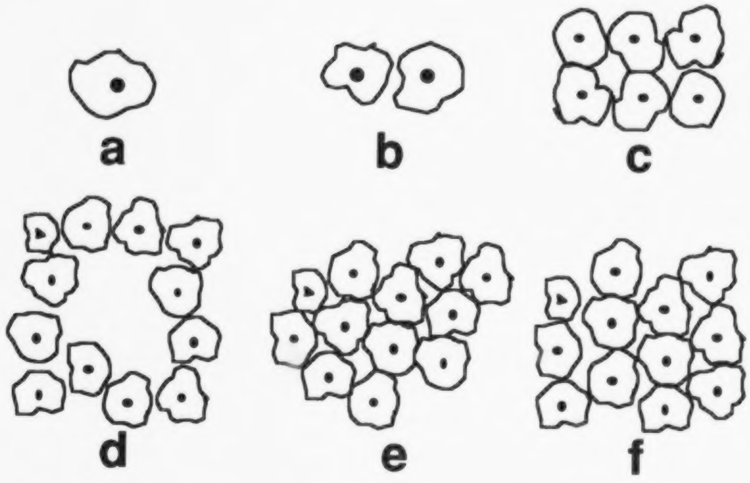
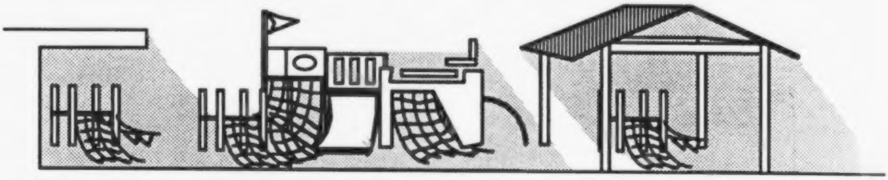


Figure 7.15 Tree arrangements on the playground can shade, beautify and frame the play area. The basic arrangements are a) umbrella, b) pair, c) avenue, d) courtyard, e) grove, and f) orchard (after Alexander, Ishikawa, Silverstein, Jacobson, Fiksdalil-King & Angel,1977, pp.797-800).

In some cases where shade trees are not available, a man-made shade area can be constructed or a building overhang used (Chu & Topps, 1979, p. 131). Suggestions for overhangs and mechanical structures are now available on the commercial market (see figure 7.16). Although these structures may not be as aesthetically pleasing as a tree, the shade that they provide can keep the adult in the general vicinity of the play area and thus, support the part parents, teachers and play leaders can take in the development of players.

One little considered but important variable that children quickly realize, is the ability of the structure itself to provide shade. If play structures on the playground are designed and constructed of multi-levels then small shaded areas for sand and water play can be constructed within the confines of the structure itself. As a design concept, the consideration for shade and wind break areas can be important to the success of sand and water play.



Overhang **Multilevel Play Structure** **Shelter**

(After Chu & Topps,1979,p.13 (After Miracle, 1986, p.100)

Figure 7.16 Shade is also provided by building overhangs, man made shelters designed for that purpose, and the structure itself when that structure is of multilevel in design.

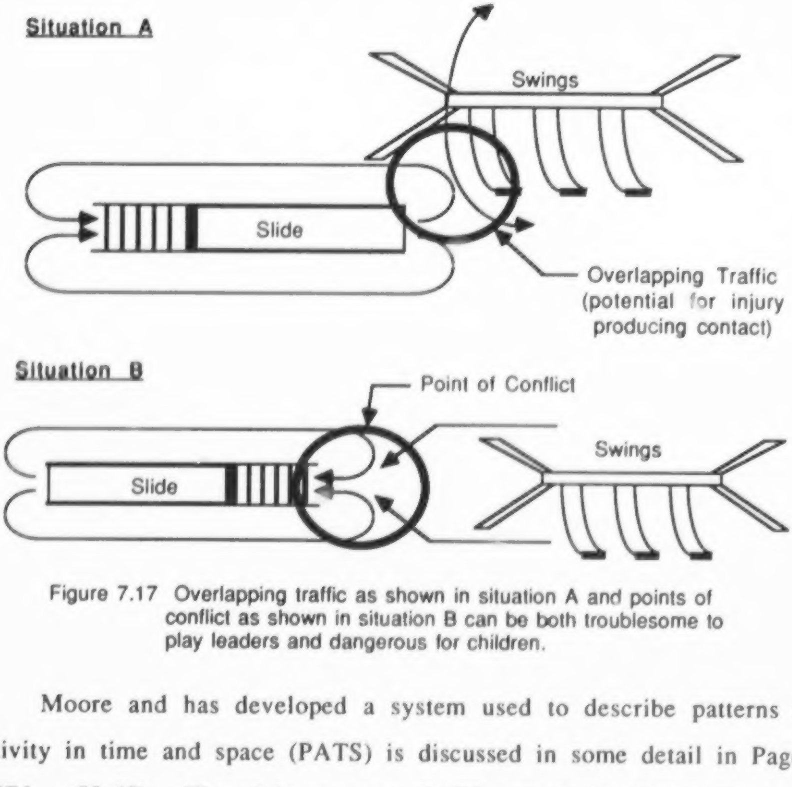
Pathways. Pathways within a playground area can be important for development in two ways. First, these pathways can serve as an indicator to adult caregivers of the route or desired lines [user desired lines of travel] (Chu & Topps, 1979, p.7) children use between events or parts of the playground (Plantinga, 1977, p.17). Secondly, these pathways can provide hard surfaces upon which wheel toys might be used, or upon which handicapped wheelchair children might approach the structure. If hard pathways are not provided on a playground then it is probable that children will search for surfaces elsewhere for use as pathways for wheel toys.

Unfortunately, the place frequently found is located in the street (Bengtsson, 1970, p.188).

Pathways to Events. As an indicator of use routes, pathways can serve as one way to discover the limitations of a playground arrangement (Heseltine & Holborn, 1987). For example it quickly becomes apparent that equipment placed too close together may actually encourage a disruptive play pattern (i.e., one which lacks clearly defined routes of travel) (Kritchersky, Prescott & Walling, 1977, p.18).

Children soon discover or learn through observation that there are usually several ways to get from one place to another. After a time and almost as if a separate play pattern, the traverse time and distance from equipment to equipment becomes a fascination. "...They move themselves from place to place shortening the time it takes to do this" (Lindberg & Swedlow, 1980, pp. 155-156).

The fascination with travel can of itself become absorbing. This creates a set of potential problems for which careful design can only be the solution (Heseltine & Holborn, 1987, p.172). When placing pathways within a design for a playground, it is important to consider decreasing the number of conflict points in which overlapping traffic might occur (PLAE Inc., 1986, p.79; Simpson, 1978, p.16 and see Figure 7.17). An example is when children use a straight line path to another part of the playground which leads them into the projecting path of the swing. If the players are small and absorbed in traverse fascination, it is unlikely that they will attend to objects which may swing to hit them. Instead they will walk in front of a swing and into the path of a potentially lethal object.


Situation A

Situation B

Swings
Slide
Overlapping Traffic (potential for injury producing contact)
Point of Conflict
Swings
Slide

Figure 7.17 Overlapping traffic as shown in situation A and points of conflict as shown in situation B can be both troublesome to play leaders and dangerous for children.

Moore and has developed a system used to describe patterns of activity in time and space (PATS) is discussed in some detail in Page (1976, p.55-60). The eight category PATS system is helpful when attempting to understand the pathways of children who use traditional and/or linked/unified structures. The traversing function while playing on traditional structures can be spatially described as a series of pathways which adhers to the mobile or chain spatial play pattern (Page, 1976, p.57 see Figure 7.18). The players' use of multiple events on a structure can be spatially described as a series of pathways which adhers to the localized spatial play pattern (Page, 1976, p.52 and see Figure 7.19). Structure pathways which are localized are also referred to as play routes (Bruya, Carter & Fowler, 1983) or traffic patterns. They are most characteristic of contemporary format structures of a linked or unified design (Bruya, 1985b; Shaw, 1976; Page, 1976, p.57).

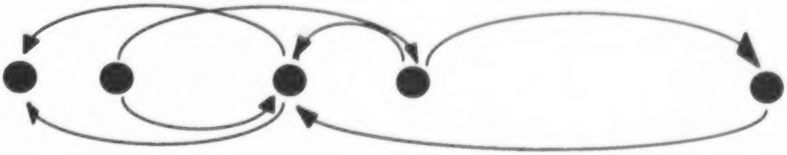


Figure 7.18 The mobile or chain spatial pattern describes the pathways used when the playground or play structure contains more than one focal point (after Page, 1976, p.57).

On structures which are linked, multi-leveled and or multi-evented children's play may be described as being localized and of the same form as mobile or chain spatial play only of a more compact nature (see Figure 7.19). Usually this type of pattern demonstrates "far more continuous action, [a] much wider range of tempo..." and a wider range of behaviors (Page, 1976, p.57).

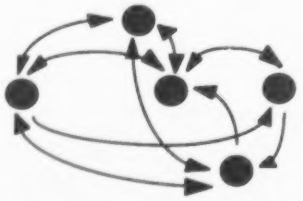


Figure 7.19 The localized spatial pattern of pathways is usually more characteristic of linked or multi-evented structures.

In a study of play routes used by 3-4-5 year-old children on a contemporary linked or unified format structure Bruya, Carter and

Fowler (1983) indicated that routes designated by frequency of use within the structure itself were of two types. Primary routes or pathways received use of thirty repetitions or more per 20 minute play session. Secondary routes or pathways were those used between 10-29 times per 20 minute play session, while little used routes were those which received a repeated use of 10 or less.

One interesting note concerning this study was that during a 20 minute time period and within the confines of a play structure ground surface containment barrier, fifteen 3-4-5 year old children traversed slightly over .1 of a mile. It was also determined that 5 year-old children tended to repeat a play route more frequently than did 3 and 4 year-old children (Bruya, Carter & Fowler, 1983).

Hard Surface Pathways. The second important consideration for the existence of pathways is to support the use of wheel toys and chairs. This type of play surface designed for the playground is sometimes designated a 'trike trail' (N. Simpson, cited in Frost and Klein, 1979, p. 198). Frost and Klein (1979) indicate that 'trike trails' or paths for wheeled vehicles should have "gentle slopes and gradual curves to prevent undue speed and tipping over..." (p. 84). Further, design competition documents for 'A Playground for All Children' held in August, 1979 contained information which suggested that pathways should 1) be at least 36" in width or wider to accommodate wheelchairs (also PLAE Inc., 1986, p. 76), 2) wind throughout the playground, and 3) contain at least one intersection in a closed loop (cited in Frost & Klein, 1979, p. 231). Construction plans for hard pathways are available in Chu and Topps (1979, p. 29).

The concept of intersections in pathways is considered by some designers and play specialists to be important. PLAE Inc. (1986, p. 78) indicated that pathways should be available in a wide variety of sizes and types. These choices of pathways are needed since they are designed to provide circulation routes both on and through the play area. Basically, pathways, or circulation routes may be of an indirect type or of an intersecting circle type (PLAE Inc., 1986, p. 79). Indirect routes are designed to provide children the opportunity to explore the setting away from the main centers of activity. Unlike the direct route (Heseltine & Holborn, 1987, p. 172) choosen by many children and demonstrated by Chu and Topps (1979, p. 7) in their discussion of 'desire lines,' 'intersecting circles' are provided "to accommodate continuity of movement and provide complex settings..." (PLAE Inc., 1986, p. 79).

Some playgrounds have been designed for children which consist almost entirely of paths and the use of wheel toys. In Copenhagen (see Figure 7.20) a playground designed to allow children to learn and practice driving skills has been developed. All of the essential traffic indicators exist on this playground (Frost & Klein, 1979, p. 217). It is complete with roadways, traffic lanes, traffic lights, street signs, and even adult leadership which could be considered by some to be the equivalent of the traffic police officer. In essence, it is a complete playground constructed of pathways and transportation type vehicles or wheel toys. Since children who play on this playground are in effect training to accept future adult roles, the Copenhagen playground is one example of the conflict-

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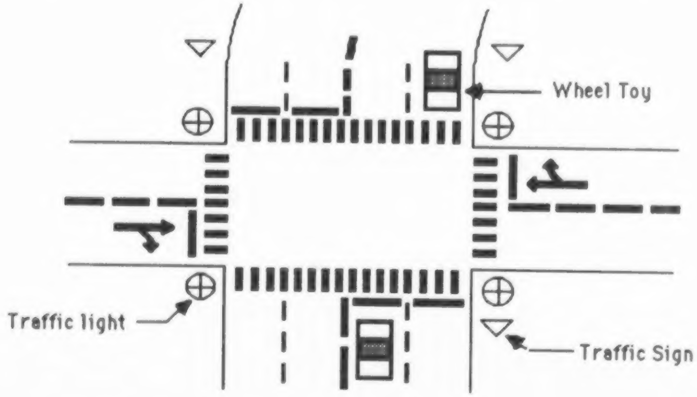

Figure 7.20 The play ground in Copenhagen is closely aligned to the conflict-enculturation theory of play (After Frost & Klien, 1979, p.217).

Methods

The results of the survey were based on 206 completed surveys from 34 trained volunteers in 23 states. The volunteers were trained at a workshop and seminar at the Atlanta, Georgia AAHPERD-AALR Meeting held in 1985. Reid and Bruya (1985) have described the reliability of the instrument and objectivity of the raters, both of which were at sufficiently high levels to insure confidence in the data. The raw data was compiled and translated into the percentages and group means which are presented here and elsewhere in the report. The data and implications for water and sand areas will be discussed first, followed by data and implications for signs, trees, and pathways.

Data Summary - Sand Play Area & Water Play Area

There were 41 sand play areas available for use on the 206 separate elementary school playgrounds assessed. This means that approximately 20% of the elementary school playgrounds surveyed contained sand play areas. These represent 1.3% of all equipment and a relatively small portion of the total equipment available for use on the playgrounds in the schools.

Of the small number of sand structures available an even smaller percentage were clean and free of debris (39%). It is likely that at least part of that debris consists of glass, nails, or pencils (USCPSC, 1980, p.5). The assessment administrators also judged that 39% of the available sand play areas would not drain well following a heavy rain.

Unfortunately, assessment data also indicated that all sand play areas assessed were not protected from the intrusion of animals. Thus, it is probable that animal excrement also soiled the areas observed.

Adult seating is only provided adjacent to or near the sand play area in 28% of the observed instances. The provision of opportunities for adults to interact with children from a seated area of relative comfort is limited. If children become involved in constructive or sociodramatic play it is unlikely that adults would be available to provide suggestions if they are needed.

Water play areas constitute an even smaller portion of available equipment than do sand play areas. There were 32 water play areas available for use, or 1% of all available equipment. This represents a water play area in 15.5% of all playgrounds surveyed. Of the small number of water play areas available, an even smaller percentage was clean and free of debris (40%). However, all 32 areas assessed were fenced.

This is a particularly important point since the average depth of the water availabe for play exceeded one foot (12.6 inches). Apparently, the administrators in the 32 elementary schools who were found to have water play areas, realize the potential danger of water this deep. They have taken the precautions necessary to keep children away from the potential hazard when left unmonitored. Also, it is apparent that principals realize that additional watchful and observant adults can add significantly to the safety of children because they have seen to it that 83% of the 32 available structures are also outfitted with adult seating adjacent to the water play area.

Implications - Sand Play Area & Water Play Area

Based on the observations made, it is obvious that sand and water play areas are not included frequently on the elementary school playground. With those that are available 25 of 73, or fully 1/3 of the areas available, may harbor disease or offer hidden injury potential due to lack of maintenance.

It seems clear that in order to improve the quality of sand and water play areas, additional supervision is needed. A provision for draining the water area each night would also provide a better solution for securing the facility when it is not attended by an adult play leader.

The sand and water areas also provide an interesting opportunity for growth and learning. Both sand and water provide an almost totally engrossing material with which to play. The unique quality of these materials, in which a new material with which to play is developed from the two materials in combination, provide a heretofore unmentioned opportunity for play, and encourage the development of the capacity to be creative.

Sutton-Smith and Sutton-Smith (1974, p. 158) indicate that mastery during play follows a sequence of action. This includes 1) examination, 2) action, 3) repetition and 4) combination. The act of combination of old elements in new and novel ways is what exemplifies the creative act. Franham-Diggory (1972, p. 512) explains that combinatory play involves " a period of...self testing wherein trial organizations are attempted and discarded." Further she explains that two other processes are included in the creative act. These are 1) the intuition of an order or the belief that an organization is possible and 2) that techniques or styles of ordering elements are used (see Figure 7.21).

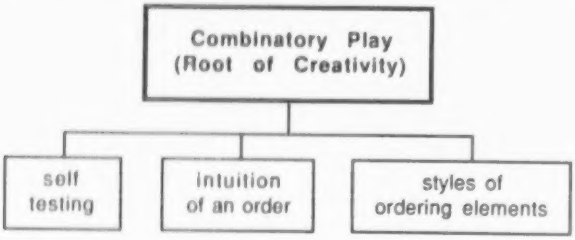

Figure 7.21 Combinatory play is the key to encouraging creativity on the playground.

In other words, the basic elements of sand and water captured for use on playgrounds also can foster the development of creativity. These elements provide for children what other equipments can't:

the chance to control changes in the environment according to their own designs, techniques, or styles of ordering.

Although children can organize the sand and water areas in ways which reflect their own sense of organization, part of the advantage of sand and water is realized only when other materials are placed in the general vicinity of the sand and water areas. When this occurs, Friedberg (1975) would label the act of placing together the materials to be used, as 'juxapositioning equipment' (see Figure 7.22). This means that the materials are "in proximity to each other so as to become complimentary" (Plantinga, 1977, p.18). Use of this element of design creates an effect in which the complimentary elements "create twice the play value that separate elements [do]" (Plantinga, 1977, p.19).

The unique manipulative quality of sand and water also can place it in the category of loose parts (Nicholson, 1971). Loose parts equipments and materials allow children to work objects in ways that reflect their own sense of order. "Young children especially feel compelled to work and rework materials" (Stone, 1970, p.21). Only through the inclusion of loose parts on the playground is the reworking of materials possible. In fact some theorists indicate that "play environments high in 'loose parts' lead to increased cognitive, social-cognitive and cognitive-motor play..." (Moore, 1985, p.173) because they allow children to manipulate them during play (see Figure 7.22).

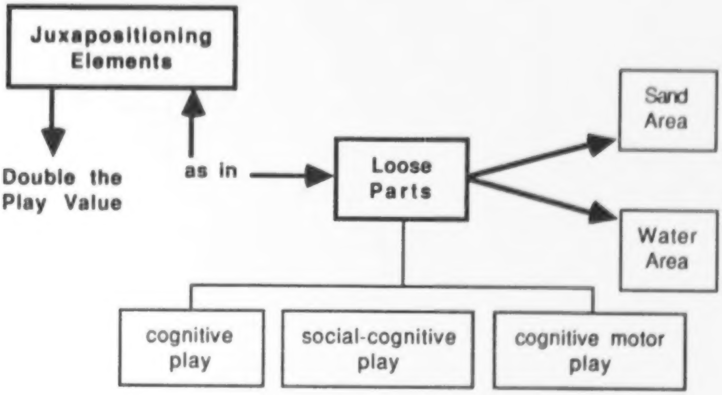

Figure 7.22 Juxapositioning elements as in the case of the addition of loose parts to the sand and water play areas can increase the play value of the environment.

While chances to develop during play with sand or water are thought to primarily occur in the social and cognitive domains (Friedberg, 1975 and see Figure 7.5), development in the psychomotor domain is also possible. The sand and water areas on a playground provide the opportunity for manipulation and the use of fine motor skills (Parten, 1971, p.91). The need for these skills is not well attended to through the use of the other equipment already described in earlier chapters. Basically, it can be said from the results of the survey, when taken as a whole, that fine motor skill development is essentially ignored on our elementary school playgrounds.

The provision of sand and water play areas in our elementary schools primarily provide activities in fine motor skills through manipulation. Thus, if educators in our schools feel that the playground should provide the opportunity for the development of these skills, then the water and sand areas should be better maintained, better designed, and provided in far greater frequency.

Social development also can be fostered in a sand and water play area through sociodramatic play. Without the availablity of these areas on our elementary school playgrounds, this type of development is not supported to the extent that it might.

Opportunities for cognitive growth are also limited when these areas are not provided. Sand and water play activities support cognitive develoment in situations which include exploration, imagination and problem solving. Sand and water allow children the opportunity to make changes in the environment (Friedberg, 1975, p.12). Making changes during play also provides the control that children need over their own environment during episodes of weighting balancing and measuring volumes.

Data Summary - Signs, Trees and Pathways

Section 12 of the Survey addressed the issue of signs, trees and pathways on our elementary school playgrounds. On the 206 playgrounds assessed, 11% or 23 playgrounds contained signs. Of these twenty three, 8 playgrounds contained signs which provided details for seeking assistance in case of injury; 7 contained signs listing cautions or warnings; 8 contained signs which excluded animals from the playground.

Trees present on the playgrounds assessed were slightly more frequent. On the average, there were 6.9 or about 7 trees per playground. However, the playgrounds also included manmade structures which provided shade. Fully 18% or 37 playgrounds contained these structures.

The provision of pathways were far more prevalent on playgrounds than were shade producing structures or signs. For the elementary schools included in the survey, 48% provided hard surfaces. This means that 99 playgrounds contained pathways which could be used by wheel toys.

Implications - Signs, Trees and Pathways

Unfortunately, the lack of signage on the playgrounds of our nation is not a good indication, given the legal climate of the 80's. Although most of the discussed categories of signs will not significantly increase the play value of the equipment provided, they can help protect those in charge of the safety of the children who play on the playground (Bruya & Beckwith, 1985). The issue of warning players and the parents of players concerning the inherent dangers present on the playground can be used in a supportive way in case of lawsuits which claim negligence on the part of playground leaders and administrators.

Basically, all five types of signs as suggested earlier which might be present on the playground (see Figure 7.8) are either entirely missing on the assessed playgrounds or are insufficient to make a significant contribution. Signs which provide 'information' lacked descriptions of accessibility, although a very small percentage did provide indications of emergency call locations. Signs of 'direction' were totally missing, thus indicating that elementary school playgrounds lack traffic path indicators. Signs of 'identification' were not provided on any playground assessed so there were no indicators of challenge levels which could assist players and their parents in selecting the safest levels of challenge. Although there were a few playgrounds which contained signs designed to 'regulate' activity, it was apparent that they were far too few to insure administrators or play leaders that they could count on support in court if the question of provision of warning became an issue (see Risk Management chapter for further information). But, probably most important for the development of children is the lack of 'curriculum' signage designed to support the potential for the expansion of play experiences.

In other words, the lack of signage stands as a symbol of two missed opportunities. First, lack of support for administrators and play leaders is apparent, and second, lack of support of the play patterns of children is evident.

Although it is obvious that in the majority of instances, play leaders and administrators are not taking the care necessary to cover themselves through signage, designers and administrators have taken care to ensure at least some shade on the elementary school playgrounds. The use of man-made structures and the frequency of trees indicate that adults are generally aware of the need for protection from wind and the need for shade. Unfortunately, the instrument used to assess the play structures did not include a report on whether the trees provided were actually used for purposes other than wind and shade protection, i.e. for climbing or for tree house structures as discussed earlier (see Figure 7.14).

In addition, report information taken from the instrument did not provide an overview of how the trees present were configured. Thus it is impossible to comment on the potential the trees might have for aiding play patterns by creating environments or senses of enclosure or protection through their configuration (see Figure 7.15).

The topic of pathways on playgrounds received little actual attention from items within the instrument. Like the categories of signs and the category of trees, pathways were only briefly assessed (one item). The assessment item merely recorded their presence and did not question the design or state of the pathways.

It can only be assumed from other data that the pathways or routes between or on the structure were predominantly of the mobile or chain spatial pattern (Page, 1970, p. 57 and Figure 7.18). This can be assumed since virtually 100% of the structures reported in the survey were of the separated traditional format (Bruya, 1985b, p. 116). In effect, the potential for localized spatial patterns or pathways (Page, 1976, p. 57 and Figure 7.19), characteristic of linked unified structures are missing from the playgrounds of our schools.

However, the existance of hard surface pathways through or near elementary school play ground structures is evident in almost half of all playgrounds assessed. This is important for two reasons. First, hard surfaces allow wheel chairs to approach the structures and second, wheel toys may be used by the players. Although many experts feel that wheel toys are vital instruments of play (PLAE Inc., 1986, p. 79, 268; Community Playthings, 1981, p. 21, 30) no questions were included in the instrument for assessing the availability of wheel toys.

If wheel toys do exist on the playgrounds at the elementary schools of the nation they would probably include several types and variations. These include 1) tricycles (Hewes, 1975, p. 151; PLAE Inc., 1986, p. 79), 2) things to push like lawn mowers or doll carriages (Caplan & Caplan, 1973, p. 19), 3) wagons (Lindberg & Swedlow, 1980, p. 156; Frost & Klein, 1979, p. 121), 4) platform trucks and four-wheeled wheelbarrows (Singer & Singer, 1977, p. 155), 5) bicycles and pedal cars (Heseltine & Holborn, 1985, p. 104), 6) animal wheel toys (Community Playthings, 1981, p. 21), and 7) shopping carts (Noren-Bjorn, 1982, p. 168; Singer & Singer, 1977, p. 155).

The advantages of wheel toys on the playground are three-fold. When present they "encourage physical, social and fantasy play" (Heseltine & Holborn, 1985, p. 104). They can also be used in many sociodramatic productions (Singer & Singer, 1977, p. 156). In some kindergartens in the schools, wheel toys even figure heavily in instructional units in which modes of transportation are studied (Lindberg & Swedlow, 1980, p. 155).

If wheel toys for use by primary age children are missing from these playgrounds in which hard surfaces are provided, then it is just short of tragic. It means that the opportunities which wheel toys present for play and curriculum are absent from the play experiences of children during school hours.

Summary and Recommendations

Data from sections 10, 11 & 12 on sand, water, signs, trees and pathways are distressing. The implications for missed opportunities to support the play patterns of children are many. In the case of sand and water play events, frequency of occurrence is particularly distressing. Because there are so few structures for these types of play it is highly unlikely that sociodramatic play which is so important for the development of our children is being supported to any great degree. This is also true for the advantages of wheel toys. They are probably missing from elementary school playgrounds and thus these playgrounds lack wheel toy advantages which could occur on the hard surfaces or pathways.

In addition, it is likely from the lack of sand and water play areas that small manipulatives and other loose parts are probably not available. Of course these materials account for the majority of fine motor skill demands on the playground. Without them these skills are very likely not practiced at all.

It is also appaent from the discussion involving shade structures that the use of trees and shade structures on the play grounds should be studied more thoroughly. The same can be said for the use of pathways since we know that hard surfaces are available at least half of the time. It is possible to determine using information recorded earlier in the instrument (see Item 3.1 - equipment interconnected) that all of the equipment observed was of the traditional format. This fact adds skepticism to the notion that the schools of our nation are responding to the recent design directions now available on the open market. The linked unified structure designs are thought to provide continuous play action and a wider range of play behaviors for our children. Unfortunately, it appears that the past ten years of work by designers and play companies is not currently widely accepted.

Current Play Structures on The Elementary School Playground Fail to Support and Encourage the Total Development of Our Children

If this summary view and the summary views expressed in the previous chapters are taken as a whole, playgrounds in our elementary schools are missing by a large margin their designed intention of supporting and encouraging the total development of our children. This message, now substantiated with data, provides a *post hoc* justification for the National Survey of Elementary School Playground Equipment.

End Notes

1. This chapter will also focus on the potential for development of facilities in these areas of the playground for use in our elementary schools to support the total development of the child. This information may be seen by some to have more relevence to after school activities which take place on the school playgrounds after school rather than during school.

This report will first present an overview of what is proposed for use in these areas as reflected in the literature, and then place the currently available elementary school playground solutions or the lack there of, in context, with proposed solutions intended as a backdrop for comparison. It is assumed that the reader is not aware of most of the information found within this section since the reference list indicates a rather wide spread information base for these sections. References are used extensively throughout for the purpose calling attention to the many sources available.

Departure from APA referencing format is noticeable since page reference sources are listed for which none are required. This was felt to be necessary since some of the sources are photographs, secondary topics in paragraphs and/or after thoughts within the text of other comments. Unfortunately this type of referencing became necessary since the areas of concern in this section have heretofore seemed only to have been secondary considerations. The concepts contained within the playground areas of 1) sand, 2) water, 3) signs, 4) trees, and 5) pathways are none the less important to the potential for development of the players. They must not be dealt with lightly on our elementary school playgrounds in the future

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CHAPTER 8

MAJOR FINDINGS: THE STATE OF OUR ELEMENTARY SCHOOL PLAYGROUNDS

The ideas presented in this chapter reflect concerns professionals have regarding the need to improve our playground. The concerns arise from the background each contributor brings to the profession. The topics include 1) the number of sex typed equipment on the playground, 2) safety problems on our playgrounds, 3) preparation for conducting a safety process on our playgrounds, 4) the lack of developmentally appropriate equipment on our playgrounds, 5) safety surfacing under our playground structures, and 6) the need to organize a concerted effort to improve the quality of our playgrounds (see Figure 8.1).

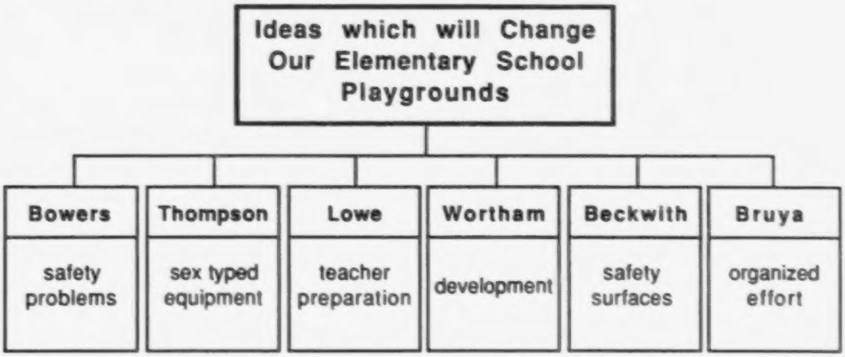

Figure 8.1 Some needed changes which will likely redefine the elementary school playgrounds as we now know them.

Although the ideas expressed in this chapter are by no means a conclusive list of changes which are needed on playgrounds, the need for change is obvious. Additional remediation programs are likely to develop as professionals involved with the welfare of children read, interpret, and use the information reported by the National Survey of Elementary School Playgrounds.

CHAPTER 8A

TWENTY ONE RESULTS: SEVENTEEN SAFETY PROBLEMS

by

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The following are highlights of the results of the status of elementary school playground equipment based on surveys of 206 playgrounds completed by 34 trained volunteers in 23 different states. The results may be categorized into the following areas: 1) types of equipment, 2) safety concerns, 3) children's development, 4) accessibility (Figure 8A.1). However, the major findings of the study were predominately concerned with design and maintenance as they relate to safety. In all, seventeen major items were surveyed which provided data upon which to question the safety of the elementary school playground structures.

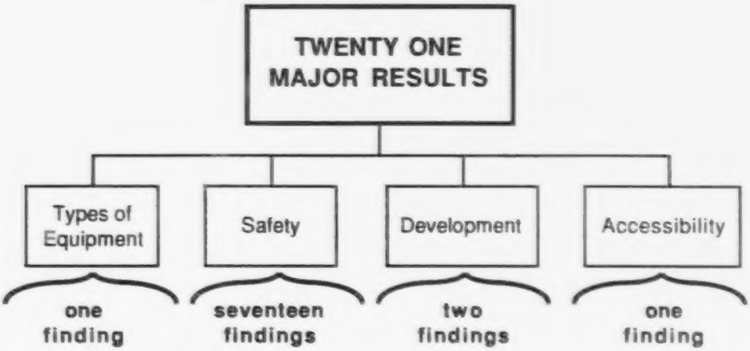


Figure 8A.1 Four categories of major results are evident from data provided by the survey.

Equipment

For the most part the structures on the elementary school playgrounds of our nation are traditional in nature. The equipment found there is much like that found on the playgrounds when the children's parents went to school. The equipment includes the following:

- The most commonly found play equipment on elementary school playgrounds included: chinning bars (16%), swings (13%), overhead ladders (10%), flat slides (9%), fireman pole (9%), balance beams (8%), monkey bars (8%), seesaws (6%), geodesic domes (3.5%), spring rockers (2.7%), and merry-go-rounds (1.4%).

Safety

Unfortunately, the safety of our children is in jeopardy each time they play on the playgrounds of our schools if the findings of this survey can be generalized to all elementary school playgrounds of our nation. The safety problems can be divided into two categories which reflect design problems and which reflect neglect in maintenance (see Figure 8A.2).

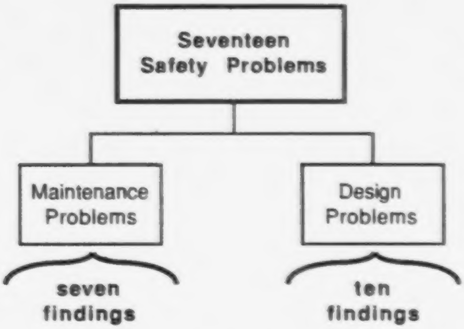


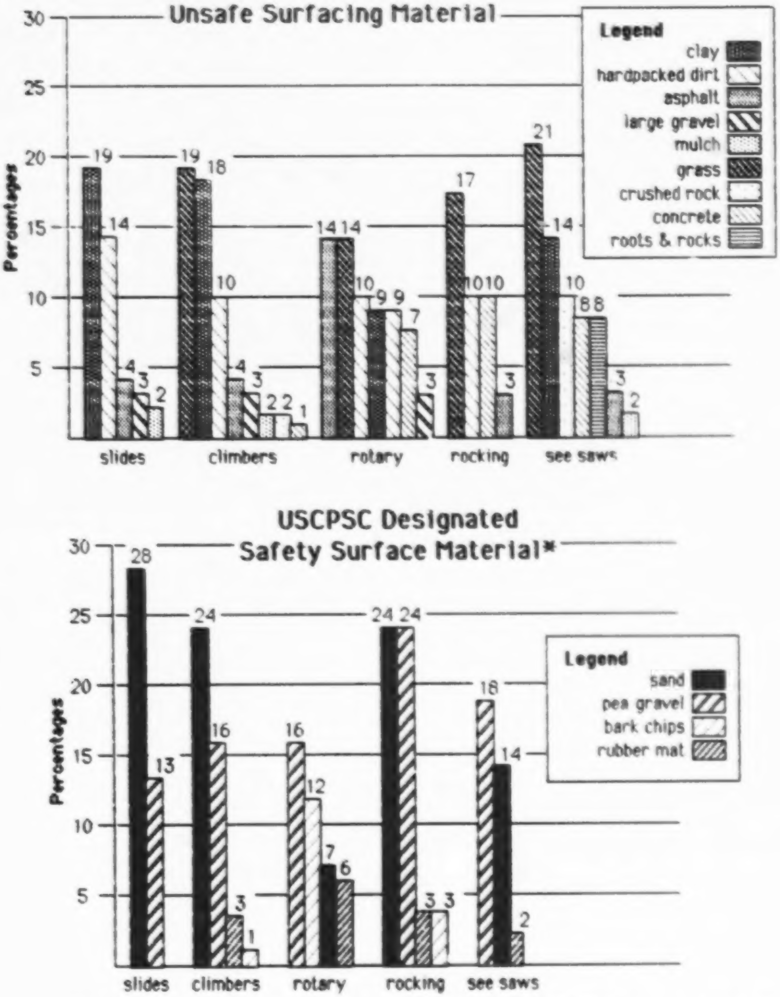
Figure 8A.2 Safety problems associated with the elementary school playgrounds are most easily categorized in two groups about equal in size.

Maintenance Problems. It is obvious from survey data that school maintenance departments and custodial staff either overlook the condition of playground play structures or are not called upon by the school administrators and teachers to repair the structures. In either instance this oversight indicates a lack of concern for the safety of our children. Further, these oversights appear to demonstrate a general disregard for the vulnerability of children as they engage in play.

The major maintenance problems identified by the National Elementary School Playground Equipment Survey are listed as follows:

- On sliding equipment sharp corners, edges, or projections were found on 34% of the playgrounds, and broken or missing parts were present 29% of the time.

- There was an average of 5.6 exposed concrete footings around the support structures of play equipment on each playground.
- The ground surface under the sliding equipment consisted of sand in 28% of the observations, clay (19%), hardpacked dirt in (14%), pea gravel (13%), asphalt (4%), large gravel (3%), and mulch (2%) (see Figure 8A.3).
- The surface material under the climbing equipment consisted of sand for 24% of the playgrounds, grass (19%), clay (18%), pea gravel (16%), hard packed dirt (10%), asphalt (4%), large gravel (3%), rubber matting (3%), mulch (2%), crushed rocks (2%), concrete for 1% and tan bark (1%) (see Figure 8A.3).
- The surface material under the rotary equipment consisted of pea gravel for 16% of the playgrounds, asphalt (14%), grass (14%), tan bark (12%), packed dirt (10%), clay (9%), dirt (9%), concrete (7%), sand (7%), rubber matting (6%), and large gravel (3%) (see Figure 8A.3).
- The surface material under the rocking equipment consisted of sand for 24% of the observations, pea gravel (24%), grass (17%), hard packed dirt (10%), concrete (10%), rubber matting (3%), asphalt (3%), and tan bark (3%) (see Figure 8A.3).
- The surface material under the seesaw equipment included grass for 21% of the observations, pea gravel (18%), clay (14%), sand (14%), hard rocks (10%), concrete (8%), roots and rocks (8%), asphalt (3%), mulch (2%), and rubber matting (2%) (see Figure 8A.3).



*Note: Depth of surface material designated by the USCPSC for use under play structures was not assessed in this survey.

Figure 8A.3 Although surfacing under the structures have been classified in the results of the survey, information concerning their depth was not collected, thus providing only limited understanding of this important feature.

Design Problems. For years the type of equipment generally found on the elementary school playgrounds has remained constant. As a result it would seem reasonable to hope that the design of the equipment would improve. The results of the survey demonstrate that if design improvements have occurred, they have not been insufficient to improve the level of safety desired.

The major design problems isolated by the National Elementary School Playground Equipment Survey are listed as follows:

- Of all the swing seats found on playgrounds, 15% were made of metal or wood.
- There were sharp corners, edges or projections on 41% of the play-grounds.
- There were sharp corners, edges, or projections on 47% of the rotating equipment.
- Sharp corners, edges, or projections on any part of the swing seat, chain, or swing structure were observed on 26% of the playgrounds.
- There were sharp corners, edges, or projections on 24% of the spring rocking equipment, and on 38% of the equipment, fingers or toes could be pinched by the spring action.
- There were sharp corners, edges or projections on 53% of the seesaw equipment, and 51% of the pivotal moving parts were accessible to fingers being crushed.
- It was possible for children to climb 10 feet or higher on 30% of the sliding equipment and 8 feet or higher on 40% of the equipment.

- The average height from the ground that a child can climb on the climbing equipment was 9.3 feet; however, 30% of the equipment allowed for climbing 12 feet or above and 10% allowed for climbing 15 feet or above.
- On 31% of the climbing equipment, there were open holes at the end of the pipes which could trap fingers.
- On 53% of the rotating equipment, the area surrounding the rotation post was open so a child could fall through.

Development

For years, experts have indicated that play is the child's work Moffitt & Swedlow, 1974; Butler, 1978; Gotts & Quisenberry, 1978). Piaget (1956,1962), Brunner (1975), and Erickson (1963) believe that it is through play that young children develop. But even with professions calling for support for play, the elementary school play ground lacks developmentally sound design, i.e. equipment which fails to support physical, emotional, psychological, and social development of children.

Listed below are two indications isolated by the National Elementary School Playground Equipment Survey which indicates that developmental needs of children are probably overlooked on our playgrounds:

- There was smaller sized play equipment for young children present on only 64% of the playgrounds.
- Of the 206 playgrounds surveyed, only 20% had sand play areas and 15% had wading pools.

Accessibility

In recent years lawmakers in our nation have become more sensitive to the needs of handicapped populations. With the initiation of Public law 94.142 rducational facilities must provide access to handicapped children as well as those who are not handicapped. Thus, it is not a novel idea to assume that play environments within the elementary school setting should also serve handicapped children.

However, most of the structures found on the playgrounds assessed in this survey failed to account for the special needs of handicapped children. Listed below is one indication isolated by the National Elementary School Playground Equipment Survey that the needs of handicapped children are probably overlooked on our playgrounds:

- In only 3.6% of the 206 playgrounds could a child in a wheelchair get up to and on the play equipment.

Conclusion

The survey was broad and inclusive although not exhaustive. Further study must be completed in the years to come if the play structures on our elementary school playgrounds are to improve. It is only through additional work that the public will be educated to support the improvements needed on the playgrounds of our nation.

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CHAPTER 8B

OUR NATION'S PLAYGROUNDS: IN NEED OF HELP

by

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After considering the results of the National Survey of the Elementary School Playgrounds, it is apparent that there is need for concern about safety. Areas which deserve immediate attention are footings, sharp edges, projections, missing parts, surfaces and heights. In addition, only 3.6% of the playgrounds make provision for disabled children. This fact indicates that most play areas are also unsafe for this population.

Play Patterns and Sex Appropriate Equipment

The survey further indicated that the equipment found on elementary school playgrounds primarily provide only for physical activity consisting of low organizational skills (Crum and Eckert, 1985). In addition, using the Crum and Eckert system to sex type equipment, two pieces of equipment for which data were reported in the survey were considered masculine, one was classified as feminine, while one was labeled neutral[1]. When using the classification systems developed in the Crum and Eckert study to determine the appropriateness of the equipment in our elementary schools, over 43% of all equipment surveyed was geared toward the expressed needs of females while a mere 1% of the equipment was geared toward the expressed needs of males. Obviously, greater equity of equipment reflecting the needs and preferences of each sex would be desirable.

Basically, this survey indicates that builders of playgrounds need to attend better to the developmental needs of both sexes. Existing equipment is neither age divided or both-sex appropriate. Results of the survey further indicate that neither sequencing events nor sequencing challenges are possible for either young or old players.

Maintenance

From survey results, it is also obvious that maintenance of elementary school playgrounds is neglected. Perhaps the assignment of a safety inspector in charge of monitoring the playground on a regular basis would help solve this problem.

Unanswered Questions

Many of the results of the survey indicate that playground equipment is neither safe nor age appropriate. School officials in charge of purchasing must give careful consideration to the purposes for which the equipment will be used. This consideration and others listed below in the form of unanswered questions raised by the survey must be pondered prior to the purchase of equipment in the future:

- How will the playground equipment reinforce curricular content in physical education or other subject areas?

- If for example, it is shown that exposure to several kinds of textures helps children learn, then what designs or types of equipment will provide the textural variety needed?
- If linked play equipment design increases the likelihood of longer play episodes and subsequent increases in growth and development, then how can current play areas be rearranged to meet a linked format?
- In what ways can current play areas be adapted to meet the needs of disabled children?

Only when these questions and others like them are answered positively for the benefit of children will the quality of our playgrounds raise significantly.

Future Directions Which May Help

Although it is impossible to change the nature of playgrounds in our elementary schools overnight, it is possible to make progress toward that goal through concerted efforts. Several opportunities now await educators and designers. These opportunities come from a wide range of potential improvements, but all require future research to validate the expense of modification. Several are listed below:

1. Establish and support a consortial research effort in which professionals from several disciplines work together to observe, record and interpret results related to types of play equipment or formats for play equipment.

2. Lobby manufacturers to establish research and development departments or granting agencies so that questions concerning safety and play patterns can be found.

3. Renew reminders made to school administrators and playground equipment manufacturers of their responsibilities regarding the necessity of providing for handicapped students (Public Law 94.142 and section 504 of the Rehabilitation Act).

4. Search with concern for protection from health hazards (Esbensen, 1984) for ways to provide sand and water play areas on our nation's playgrounds.

5. Develop appropriate activities which might be used on playground equipment in physical education as well as other parts of the elementary school curriculum.

Conclusion

In spite of the fact that the survey was primarily descriptive and confined to elementary school playgrounds, the results indicate that there are definite concerns in regard to school playgrounds which must be met before severe injury and/or lawsuits prove the demise of our playgrounds. The survey of our schoolyard playgrounds provide a rich basis for further study. In addition, there are solutions which provide correction procedures for the problems which face our schools (Kirchner, 1985). Insights into these solutions have been gained through years of hard work and study. Application of solutions which are data will no doubt provide play areas which are more appropriate for children in the future.

End Notes

1. Of the equipment assessed in the Crum and Eckert (1985) study, only four appeared on the results of the National Survey of Elementary School Playgrounds.

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CHAPTER 8C

TEACHER PREPARATION: GUIDELINES FOR SAFE PLAY

by

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For those of us who work with real children on real playgrounds day in and day out, one question is of great importance: "What can educators do to better arrange the environment and the play experience for the children who use the playgrounds?" This question reflects the educators concern that they must work within the existing school playground environment even though the results of the survey, conducted by the Comittee On Play, demonstrate that safety on our playgrounds is in many instances overlooked. Since the equipment will in most cases not be removed by the school maintenance crew, and the children will continue to play on the equipment in spite of the conditions outlined by the survey, it is important that guidelines for playing safely be developed and encouraged in the children's regular play pattern.

The Task—To Establish Guidelines For Safe Play

The educator is faced with the difficult task of developing guidelines for safe play on structures which may not be designed to encourage safety or may not be well enough maintained to be considered safe. The task is to develop positive methods of establishing guidelines for a safe play program or curriculum for implementation by educators and playground attendants.

To prepare for this task the currently available literature on play and playgrounds should be reviewed. Unfortunately, a review of available materials has proven unfruitful, just as the survey has demonstrated that our playgrounds are unsafe. Little can be found which relates directly or indirectly to the actual act of preparing teachers for the responsibility of establishing a program of safe play on the playgrounds (see Figure 8C.1).

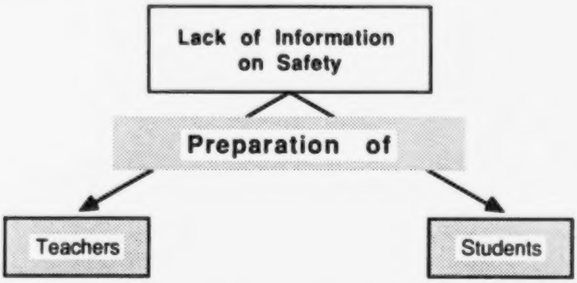

Figure 8C.1 Little information is currently available concerning a process for preparing teachers for their conduct of a safety program or preparing children for their participation in a playground safety program.

Even less can be found which discusses the involvement of children in the decision making process which leads to guidelines for safe play. Thus, it is necessary to develop materials. Safe play programming is probably based on the assumption that the playground is and should be an extension of classroom opportunities for growth and development (Canadian Council On Children and Youth, 1978), in spite of the fact that existing elementary school playgrounds do not reflect this use. The second assumption is that the playground is a true "laboratory" in which children test classroom learning and themselves (Canadian Council On Children and Youth, 1978). They evaluate their applications of physical, social, intellectual, emotional and spiritual learning in real-life active situations.

It is obvious from the results of the survey, that the elementary school playgrounds are not designed to provide integrated experiences which incorporate all individuals and all elements of curriculum involved in the total education of the child. It also becomes quickly obvious as the task of developing a series of guidelines for a safe play program continues (Lowe, in press; Bruya, in press; Warrell, in press) that an element of control and responsibility for safe acts on the play structures should be placed in the hands of the players who use them.

Resistance To Guidelines For Safe Play

There may be resistance on the part of some teachers to the idea of becoming involved in a safe play program. Probably, teacher resistance can be attributed to one of three main reasons.

1. lack of understanding of the need for and function of play in the elementary school curriculum (Lowe, In Press; Bruya, In Press; Warrell, In Press),
2. lack of experience, understanding, and sense of legal responsibility in playground supervision (Bruya & Beckwith, 1985), and
3. the lack of recent play experience (creative and/or

recreative) in their own personal lives.

Resistance from teachers to undertake a safe play process reveals the need for preparation of present and future teachers in the benefits of and need for play in the education of our children.

Conclusion

Although preparation in guiding play behavior on the playground would establish yet another dimension of responsibility for the professional already laboring under a myriad of expectations, the need for safe play behaviors on our playgrounds is obvious from the lack of safety designed into our play structures as they now exist. But, it is in the creation of new programs that we become aware of the areas in need of growth and expansion. Ultimately this could lead to better teacher preparation programs.

Thus, we must be insistent that teachers, administrators, and the school community intentionally include safe play education and guidelines for playgrounds in their curriculum. This would ensure the maximum benefits from play experience on elementary school playgrounds.

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CHAPTER 8D

DEVELOPMENT NEGLECTED ON HAND-ME-DOWN PLAYGROUNDS

by

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University of Texas at San Antonio

From the current state of elementary school playgrounds, it would seem that educators neither understand nor value the play needs of our youngest students. When the history of playgrounds or other facets of public schools are considered, it becomes obvious that the needs of older students are considered prior to the needs of younger students. The first playgrounds were constructed for the use of teenagers and organized sport activities. Playgrounds with equipment for elementary age children came later (Butler, 1960). Playgrounds with equipment for preschool age children seem to have been added as an afterthought on many of the nation's elementary school playgrounds.

Utilization of Existing Facilities

Inappropriately selected playground structures which do not meet the developmental needs of young children are only one part of the problem. It is compounded by school district use of school buildings. As the nation's population increases and school systems experience growth, school buildings are frequently "passed or handed down" (see Figure 8D.1). A new high school is built and the old building becomes the junior high, and so forth. The result is that younger elementary children frequently attend a school with playground equipment designed for older children. To combat the obvious incongruity, a few pieces of equipment of smaller scale may be included for younger children.

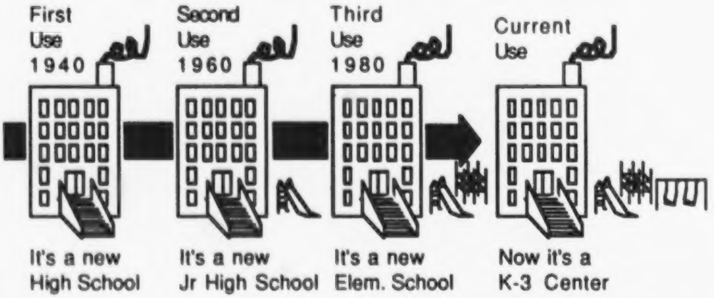

Figure 8D.1 The concept of the 'hand-me-down' school may explain part of the cause for the inappropriate equipment which now exists on our elementary school playgrounds.

Since the data collected as a result of the National Survey of Elementary School Playgrounds demonstrate the existance of inappropriate equipment, it is difficult not to wonder at the decisions which were made for the good of children. There is little evidence that school administrators and school playground developers were then or are now placing a high priority on either updating playgrounds to incorporate newer trends and developments in playground design, or making provisions for the developmental needs of the younger children who are attending school in increasing numbers.

Escalation of the Problem

The need for a solution to this problem will escalate in the next ten years as the benefits for early childhood education result in a renewed priority in preschool education. Four-year-old children now attend elementary schools in many states, as do children with physical and mental disabling conditions who benefit from early intervention programs.

Our playground development heritage has led many educators to the perception that outdoor playground activities should be devoted to sports, organized play, and physical development. Although playgrounds of this type may be appropriate for older children they lack sensitivity to the needs of younger players. The growth and development of very young children is a wholistic process which simply is not accounted for by such a limited view of the needs of children. In fact, the younger the child, the less suitable is a limited and/or simplistic view of his/her needs (Roberton & Halverson, 1984).

Instead, the growth and development of children in the early childhood years must be viewed as a comprehensive, interrelated, and simultaneous experience. As such, the act of playing is a developmentally appropriate activity. Play is self-directed and spontaneous. Through play the child learns about the world and begins to understand how to function within that world. As an active explorer during play, the child progresses cognitively, affectively, and in the psychomotor domain as well.

The outdoor play environment, located at each elementary school site should support all facets of growth and development in the young child. Further, the outdoor learning experiences should act as a compliment to those conducted indoors. Both indoor and outdoor learning experiences act together to provide an attractive and developmentally sound environment in which children can grow and learn.

Conclusion

As one considers ways to incorporate more young children into an existing public school system, educators must discontinue thinking of them as smaller versions of the students who are already there. The youngest students need a playground where an attractive environment provides them with the best possible opportunities for 1) exercise, 2) creative expression, 3) dramatic play, 4) social interaction, and 5) building and construction play.

The young children of the 80's may be playing on playground equipment designed for the 40's which, even then, were inappropriate to the needs of the players. The National Survey of Elementary School Playgrounds graphically demonstrates a need for improved playgrounds for elementary school children. Within that effort, educators must be especially sensitive to the developmental play needs of our youngest students.

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CHAPTER 8E

NEGLIGENCE: SAFETY FROM FALLS OVERLOOKED

by

Jay Beckwith
Play Structure Design Consultant

After 20 years of advocating for the installation of appropriate surfacing materials under playground equipment, the results of the National Survey of Elementary School playgrounds are very discouraging. The disappointment is more profound with each new request to be an expert witness in yet another playground injury lawsuit. Such requests are increasing in frequency and have now reached the level of several cases per month. The vast majority of these suits are related to injuries which occur as the result of falls onto hard surfaces. In every instance the cases have hinged on the Consumer Product Safety Commission's Playground Equipment Guidelines (CPSC, 1980a; 1980b), and the result of each lawsuit has been a judgement or out of court settlement in favor of the plaintiff.

Many playground injury cases are settled for less than $100,000, but some have resulted in multi-million dollar judgements. The potential economic impact alone should be enough to motivate schools to install the appropriate surfacing material under equipment. However, if unmoved by the threat of economic disaster in the school system, the school administrator should at least be sensitive to the devastation these injuries have on the lives of children.

Safety Surfacing

The data recorded as a result of the National Survey of Elementary School Playgrounds indicate that the majority of the sites surveyed were unsafe. In a legal sense, the keepers of these playgrounds could be viewed as "negligent." Since the original NRPA pronouncements and more recently those of the United States Consumer Product Safety Commission, studies have clearly established the prime safety function of resilient surfacing under play equipment (see Figure 8E.1). For administrators to feign ignorance of this information can only be termed "negligence."

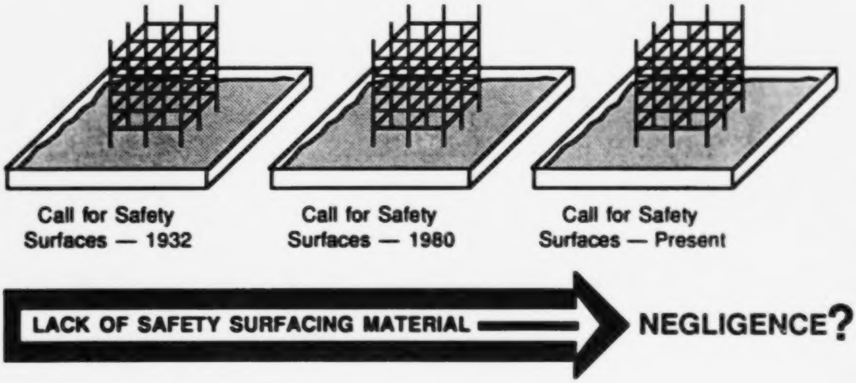
Call for Safety Surfaces — 1932
Call for Safety Surfaces — 1980
Call for Safety Surfaces — Present
LACK OF SAFETY SURFACING MATERIAL
NEGLIGENCE?

Figure 8E.1 Since 1932 and more recently in 1980 professionals in the field have called for safety surfaces under play equipment.

Play Patterns and Safety Surfacing

While the installation of an appropriate fall attenuating surface will significantly reduce the frequency and severity of playground injuries, the use of safety surfacing will not completely eliminate accidents. Playgrounds with safety surfaces stimulate strikingly different play patterns by children than occurr over hard surfaces. Children engage in more risk taking behavior with safety surfaces in place, and are generally more expansive and relaxed in their movements.

Development and Safety Surfacing

The installation of fall absorbing material under play equipment provides the setting for increased opportunities to grow and learn. The children may engage in activities of greater challenge than would be the case over hard surfaces. Heightened experimentation through the exploration of greater challenges may lead to occasional accidents but the frequency and severity of such incidents will be significantly less than on hard surface playgrounds. Thus, the net result of surface improvements will not only be reduced accidents but also greater developmental benefits for the child.

Conclusion

It is imperative that every playground be immediately provided with fall absorbing material under play equipment which meets the Consumer Product Safety Commission's Guidelines. This step will not only increase safety and reduce litigation but will also significantly change the manner in which play structures are used by children. Further research will be needed to understand the impact of increased playground safety on player behavior. It is quite possible that benefits may be derived as a result of such an investment in safety. Perhaps an empirical study to determine the actual educational benefits of safety surfaces may help to convince administrators and educators to make changes, where appeals to common sense and threats of massive lawsuits have heretofore failed.

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CHAPTER 8F

THE NEW CHALLENGE: PLAYGROUND UPGRADES

by

L.D. Bruya
North Texas State University

It is obvious from the Committee On Play survey that the elementary school playgrounds of our nation are in trouble. They do not meet the developmental needs of the children who play on them and are apparently less safe than most suspected. Do we continue using the playgrounds now in place and allow our children to play at risk, or do we undertake the monumental task and expense of redesigning or replacing the structures?

The Problem

The problem, which must be addressed very soon, is whether we as a nation plan to pay the expense of improving of the elementary school playgrounds or pay the expense of law suits plus improvements after some of our children have suffered severe injury and maybe even death (White, 1987; Kaiser, 1986). The better choice and the one which could be considered most beneficial for all concerned, is to undertake the task of upgrading the school playgrounds (see Figure 8F.1).

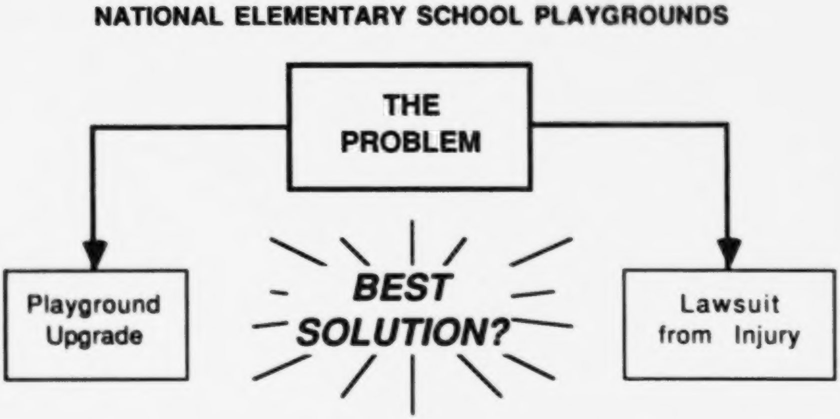

Figure 8F.1 The 'best solution' is the playground upgrade prior to severe injury to a child or loss to the school.

The upgrade task can be approached from either of two directions. First, the professionals involved in education could upgrade by rearranging the current structures on the playground and then retrofitting them with parts which support the developmental needs of the players (see Figure 8F.2). At the same time the retrofit process also must insure the safety of the players.

Second the decision could be made to upgrade or improve the quality of the elementary school playground by removing of all existing equipment. These equipments would be replaced with developmentally sound and safer contemporary structures (see Figure 8F.2).

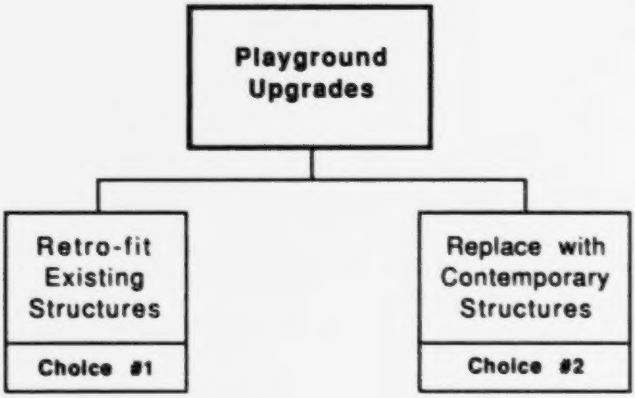
Playground Upgrades
Retro-fit Existing Structures
Choice #1
Replace with Contemporary Structures
Choice #2

Figure 8F.2 Playground upgrades can be achieved in either of two forms.

The expense of retrofitting or replacing playground structures is substantial. If the 64,000 elementary schools in the nation were to spend an average of $5,000 to retrofit or replace equipment, the total cost of retrofit or replacement would exceed three hundred million dollars. The outcome of an organized expenditure of this size could have a significant effect on the market place. Ultimately, an organized $300 million strategy could change the quality and availability of developmentally appropriate equipment (see Figure 8F.3).

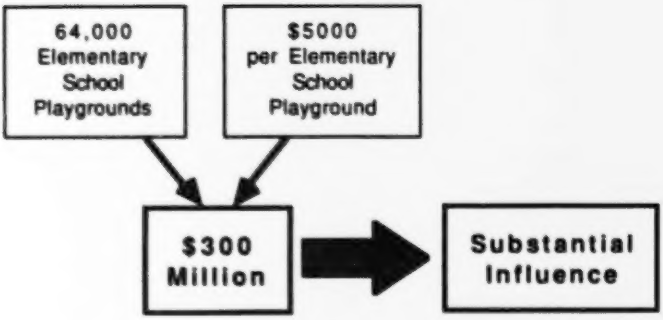
64,000 Elementary School Playgrounds
$5000 per Elementary School Playground
$300 Million
Substantial Influence

Figure 8F.3 The expense of retrofitting or replacing elementary school structures exceeds $300 million. A sum this big represents a substantial influence on the current market.

Organize to Solve the Problem

If the movement to retrofit or replace structures on the playgrounds in our schools were organized, the educators and professionals involved in providing services for children, indirectly could effect the design of the structures available simply through the selection of appropriate equipment or through organized purchasing power. By carefully selecting only the appropriate equipment, based on recent information (see Bowers, In Press and Beckwith, In Press) a new generation of equipment designed to fit the children's needs and the school curriculum could be supported to the exclusion of all others.

Unfortunately, administrators who could work to accomplish this need, have as their primary concern educational problems which face the school, and have not organized to positively effect the availability of equipment. They either have not realized the significant contribution the playground can make to the education of the child or are unable to respond to the need for upgraded play structures because of more immediate and pressing concerns (see Figure 8F.4).

What is required is a process which is implemented by an organization outside of the schools. That organizational process could be directed by a non-profit foundation; an organization that is totally removed from the jurisdiction of the school system with the capability for raising funds and administering them in the manner of a corporation (Ward, 1987). In this way, the expense of purchase to replace or retrofit each elementary school could be subsidized through an organized system of donations (see Figure 8F.4).

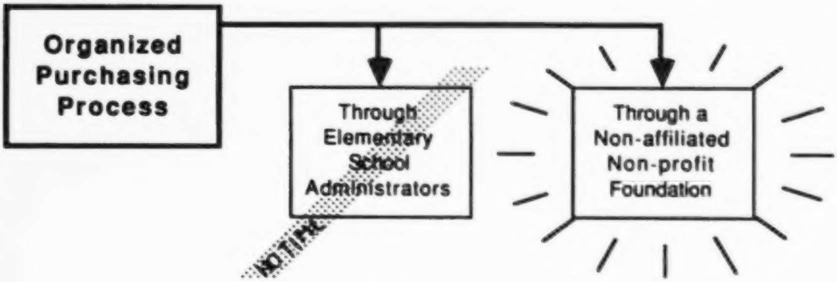
Organized Purchasing Process
Through Elementary School Administrators
NO TIME
Through a Non-affiliated Non-profit Foundation

Figure 8F.4 Since school administrators are unable to organize to effectively change school playgrounds, a foundation dedicated to that purpose may provide the needed rallying point.

At the same time, through organized buying strategies, developmentally sound equipment produced by the industry could be demanded at a rate substantial enough to effectively eliminate the less developmentally sound and/or unsafe equipment from the marketplace. In effect, a strategy could be developed through an organized foundation. This type of organization could effectively guide the industry to needed improvements in design through an organized application of buying power.

Conclusion

The conclusions to which the National Survey of Elementary School Playgrounds lead are future directions for the playground industry (see Table 8F.1). The implementation of these objectives could prove useful in the movement to provide better play structures in our elementary schools. They are: 1) develop an organized system for upgrading or replacing play structures in the elementary schools, 2) develop educational programs to help the public understand the purpose of play settings and the role they assume in development, and 3) initiate a system to increase the control and responsibility of children while they play (see Lowe, in press).

Table 8F.1 Three future directions emerge from the National Survey of Elementary School Playgrounds.

Future Directions to Accomplish Playground Upgrades
Direction #1
Organize system to retrofit or replace structures
Direction #2
Develop educational programs to educate the public concerning development related to play
Direction #3
Initiate a system to increase the control and responsibility of children for safe play

If these objectives can be met and the availablity of developmentally sound equipment increased, then the play structures and the play experience on the playgrounds will improve. The environments provided will change and the playgrounds in our schools will become true development and learning centers (Dickenson, 1977).

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APPENDIX 1A

American Alliance for Health,
Physical Education, Recreation & Dance

American Association for Leisure & Recreation

• Committee On Play •

MISSION STATEMENT

AALR-AAHPERD-COP
Committee On Play

MISSION STATEMENT

- MISSION STATEMENT FOR THE AALR COMMITTEE ON PLAY

The purposes of the AALR Committee on Play are:

- to understand the nature and function of play
- to support play
- to share information on play
- to educate for play - with a focus on the individual, society and setting.

APPENDIX 2A

National Elementary School Playground Equipment Survey

• Spr 1985 •

AALR-AAHPERD-COP
(Committee On Play)

National Elementary School Playground Equipment Survey

• Spr 1985 •

School #:___________
# of schools in the district:________

•___________________________________
Person Administering the Survey

•___________________________________
Beginning Time Completion Time

•___________________________________ • School
Enrollment:_________

____

____
Name and Address of Elementary School

Use the following symbols throughout the survey: √ = Yes X = No

Section 1: Location and Accessibility of Playground Equipment

_____ 1.1 Is the play equipment easily in view of nearby residents and/ or passersby?
_____ 1.2 Is there a fence or wall at least 3 feet high surrounding the play equipment?
_____ 1.3 Is access up to the play equipment possible for children in wheelchairs by means of a hard surface?
_____ 1.4 Can wheelchairs get up on any of the play equipment?

Section 2: Placement and Size of the Equipment

_____ 2.1 Is there at least 10 feet of space between each piece of equipment and other structures, so as to avoid collision of moving children?

_____ 2.2 Is all equipment placed so as to avoid collision or interference with traffic patterns of children walking or on wheel toys on designated pathways?

_____ 2.3 Is smaller sized play equipment intended for young children present?

_____ 2.4 If so, is smaller equipment separated from larger equipment so as to discourage cross over use?

_____ 2.5 How many concrete footings of in ground support structures are exposed?

Section 3: Type and Number of Equipment

_____ 3.1 List the numbers of each type of equipment located on school playgrounds:

_____ Flat Slides
_____ Tube Slides
_____ Swing Structures
_____ Exer-Glides
_____ Merry-Go-Round
_____ Seesaws
_____ Suspended Bridge
_____ Balance Beams
_____ Spring Rockers
_____ Geodesic Dome Climbers

_____ Firemans Poles
_____ Monkey Bars
_____ Parallel Bars
_____ Overhead Ladders
_____ Chinning Bars
_____ Sand Play Containers
_____ Water Play Containers
_____ Equipment Separated
_____ Equip. Interconnected

Section 4: Swinging Equipment

_____ 4.1 Number of swing seats?

_____ 4.2 How many of the swing seats were made of metal or wood?

_____ 4.3 How many of the swings are of the swivel type?

_____ 4.4 Are swings present which are designed to accomodate young children?

_____ 4.5 Are the swings for younger children children on a separate structure from the other swings?

_____ 4.6 Have barriers been provided to discourage children from running into swings while swings are in motion?

_____ 4.7 Are all support structures for the swings firmly anchored in the ground?

_____ 4.8 Are there any sharp corners, edges, or projections on any part of the swing seat, chains or swing structure?

_____ 4.9 Are all moving parts in good working condition and not in danger of breaking?

_____ 4.10 Are chains covered to avoid pinch points?

_____ 4.11 What is the distance between each swing?

_____ 4.12 Which of the following surface materials is found under the swing?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 5: Sliding Equipment

_____ 5.1 Are parts of the equipment broken or not present?

_____ 5.2 Are there any sharp corners, edges or projections?

_____ 5.3 Is the supporting structure firmly fixed in the ground?

_____ 5.4 Is the slide wide enough to accommodate more than one child at the same time?

_____ 5.5 Is the sliding surface stable, smooth, and with no protrusions throughout its length?

_____ 5.6 Does the angle of the slide level off at the bottom to cause deceleration before the child reaches the end of the slide?

_____ 5.7 Is the end of the slide at least 13 inches above ground level?

_____ 5.8 How many feet high from the ground is the slide at its highest point?

_____ 5.9 Is there a guardrail around the platform area?

_____ 5.10 Which of the following surface materials is found under the slide?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 6: Climbing Equipment

_____ 6.1 Are all parts of the equipment securely fastened?
_____ 6.2 Are structural supports firmly fixed into the ground?
_____ 6.3 Are there any open holes which form finger traps at the end of the tubes or pipes?
_____ 6.4 What is the largest diameter of the hand holds needed for climbing?
_____ 6.5 Are there any sharp corners, edges or projections?
_____ 6.6 Is the distance between horizontal levels between 7 to 11 inches?
_____ 6.7 Are there and V angles less than 7 inches wide on any part of the equipment likely to cause limbs, feet, or clothing to be trapped?
_____ 6.8 What is the maximum height from the ground that a child can climb on the tallest piece of equipment?
_____ 6.9 Which of the following surface materials is found under the climbing equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 7: Rotating Equipment (Merry-Go-Rounds, Swinging Gates)

_____ 7.1 Is the supporting structure firmly fixed in the ground?
_____ 7.2 Are all joints and fasteners secure?
_____ 7.3 Are there any sharp corners, edges, or projections?
_____ 7.4 Is the area surrounding the rotation post open?
_____ 7.5 Does the minimum cleared perimeter extend beyond 20 feet so as to allow running space coming off of the merry-go-round?
_____ 7.6 Which of the following surface materials is found under the rotating equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 8: Spring Rocking Equipment

____ 8.1 Are all of the structural supports firmly fixed in the ground?
_____ 8.2 Are all parts of the equipment present?
_____ 8.3 Are all joints and fastenings secure?
_____ 8.4 Are there any sharp corners, edges, or projections?
_____ 8.5 Are the seating surfaces less than 30 inches from the ground?
_____ 8.6 Are there two handholds, each being at least 3 inches long?
_____ 8.7 Are the footrests at least 4 x 6 inches?
_____ 8.8 If there is spring action, can the fingers or toes be pinched?
_____ 8.9 Which of the following surface materials is found under the spring rocking equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 9: See Saw Equipment

_____ 9.1 Are all of the structural supports firmly fixed in the ground?
_____ 9.2 Are all joints and fastenings secure?
_____ 9.3 Are there and sharp corners, edges, or projections?
_____ 9.4 What is the height of the seating surface at its highest point?
_____ 9.5 Are there two handholds on each end, each being at least 3 inches long?
_____ 9.6 Can any part of the body pass beneath the equipment while it is in action so as to be struck?
_____ 9.7 Has any provision been made on the apparatus to cushion its impact upon striking the ground?
_____ 9.8 Are any of the pivotal moving parts accessible to fingers being crushed?

_____ 9.9 Which of the following surface materials is found under the see saw equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 10: Designated Sand Play Area (Sand is contained within the area for digging...)

_____ 10.1 Is the sand clean and free of debris?
_____ 10.2 Does the sand drain freely after rain?
_____ 10.3 Is the sand play area located or covered to exclude animals?
_____ 10.4 Is there adult seating provided adjacent to the sand play area?

Section11: Wading Pools

_____ 11.1 Is the pool area fenced and gated to exclude animals?
_____ 11.2 Is the water clear and free from debris?
_____ 11.3 How many inches deep is the water when filled?
_____ 11.4 Is there adult seating provided adjacent to the wading pool?

Section 12: Signs, Trees & Pathways

_____ 12.1 Are there any signs giving details of where to seek help in case of accident?
_____ 12.2 Are there any signs listing any restrictions or limitations in the use of the equipment?
_____ 12.3 Are there any signs excluding animals from the .playground?
_____ 12.4 How many trees are located within the playground equipment area?
_____ 12.5 Are there any structures which provide shade in addition to trees?
_____ 12.6 Are there any hard surfaces for wheel toys?

APPENDIX 2B

National Elementary School Playground Equipment Survey

• Trained Volunteers •

AALR-AAHPERD-COP
(Committee On Play)

National Elementary School Playground Equipment Survey
• Trained Volunteers •

Explanation: The professionals listed below are those who were able to complete training as administrators of the National Elementary School Playground Equipment Survey instrument. The training took place at the National AAHPERD — AALR — COP convention meetings in Atlanta, Georgia in April of 1985. Training consisted of the following: 1) two hours of instrument explanation, questions and discussion, 2) an on site assessment of the Chandler Park play structure in Alanta, and 3) a discussion designed to answer questions of interpretation follow the on site assessment.
It should be noted that the Chandler Park assessment which was used for establishing objectivity measures for the group of trained observers, was a very complex playground of a highly diverse nature. In the end the Chandler Park structure turned out to be a much more rigorous and difficult assessment task than did any of the 206 elementary schools assessed as a part of this study. Below are listed those volunteers who participated in the training session and thus became part of the assessment team:

• Jimmy Allen; Gastonia, NC •
• Molly Arthur; Berea, OH •
• Viola Bahls; Lincoln, NE •
• Patricia Barnett; Jonesboro, GA •
• Jay Beckwith; Forestville, CA •
• Sandy Beveridge; Salt Lake City, UT •
• Lou Bowers; Tampa, FL •
• Marilyn Bray; Midlothian, VA •
• Larry Bruya; Denton, TX •
• Lucille Burkett; Shaker Heights, OH •
• Barbara Call; Lexington, KY •
• Sheila Caskey; Cape Girardeau, MO •
• Michael Crawford; Omaha, NE •
• Mary Czentnar; Rome, GA •
• Milo Dullum; Dickinson, ND •
• Joe Frost; Austin, TX •

• Mary Belle Ginanni; Murfreesboro, TN •

Assessment Team Continued

• Sarah Grant; Halifax, VA •
• Mike Henninger; Ellensburg, WA •
• Betty Hennessey; Downey, CA •
• Donna Hester; Birmingham, AL •
• Ted Hucklebridge; Santa Rosa, CA •
• Susan Hudson; Denton, TX •
• Dot Kirkpatrick; Richmond, KY •
• Joyce Lawler; Union City, GA •
• Patty Lowe; Huntsville, AL •
• Carolyn Martin; San Bernadino, CA •
• Carolyn Masterson; Old Tappan, NJ •
• Zulette Melnick; Knoxville, TN •
• Steve Moyer; Stillwater, OK •
• Howard Nesbitt; Morehead, KY •
• Dave Oberly; Billings, MT •
• David Reames; Miami, FL •
• Ed Renfrow; Siloam Springs, AR •
• Donna Seline; Golden Valley, MN •
• Gail Stentiford; New York, NY •
• Ann Sutlive; Norcross, GA •
• Donna Tompson; Belle Plaine, IA •
• Carol Torrey; New Orleans, LA •
• Nancy Waldrop; Columbus, GA •
• Eileen Warrell; West Vancouver, BC Canada •
• Dee Watson; Grand Forks, ND •
• Gail Weston; St. Petersburg, FL •
• Sue Wortham; San Antonio, TX •

APPENDIX 2C

National Elementary School Playground Equipment Survey

• Playground Selection Process •

AALR-AAHPERD-COP
(Committee On Play)

National Elementary School Playground Equipment Survey
• Playground Selection Process •

1. Acquire a list of all elementary schools in the school district offices for the district you have chosen.

2. Number all schools listed starting with #1.

3. Select the schools you will survey, based on • Playground Selection Process • listed below.

Elementary School Playground Selection Process
(Used to Pick the Schools to be Surveyed)

A. 0-10 schools in district: assess 1 school
#2

B. 10-20 schools in district: assess 2 schools
#2, #18

C. 20-40 schools in district: assess 4 schools
#2, #18, #8, #17

D. 40-70 schools in district: assess 7 schools
#2, #18, #8, #17, #41, #13, #36

E. 70-100 schools in district: assess 10 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81

F. 100-150 schools in district: assess 15 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124

G. 150-200 schools in district: assess 20 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112

H. 200-250 schools in district: assess 25 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112, #212, #131, #230, #25, #70

I. 250-300 schools in district: assess 30 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112, #212, #131, #230, #25, #70, #245, #220, #115, #107, #281

J. 300-350 schools in district: assess 35 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112, #212, #131, #230, #25, #70, #245, #220, #115, #107, #281, #309, #59, #176, #54, #160

K. 350-400 schools in district: assess 40 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112, #212, #131, #230, #25, #70, #245, #220, #115, #107, #281, #309, #59, #176, #54, #160, #351, #382, #282, #153, #114

L. 400-500 schools in district: assess 50 schools
#2, #18, #8, #17, #41, #13, #36, #94, #26, #81, #97, #143, #111, #113, #124, #125, #11, #152, #4, #112, #212, #131, #230, #25, #70, #245, #220, #115, #107, #281, #309, #59, #176, #54, #160, #351, #382, #282, #153, #114, #20, #257, #203, #423, #426, #396, #201, #354, #485, #172

Note: For school districts larger than 500 call L. Bruya collect at 817/565-2651, leaving your name, phone and the number of schools in the district. He will return your call with additional numbers of schools to survey.

Please survey each school listed on the list even if it has no play structure. If a school has no play structure, note it on the *National Elementary School Playground Equipment Survey* and send it in.

Please list the # of the school selected on the survey instrument as well as the number of schools in the district.

APPENDIX 2D

Playground Equipment Assessment

• Spr 1987 •

AALR-AAHPERD-COP

Playground Equipment Assessment (PEA)

• Spr 1985 •

© by Committee On Play, AALR

School #:____________

Number of schools in the district:____________

•____________________________________

Person Administering the Survey

____

• date survey conducted:

•____________________________________

Beginning Time Completion Time

•____________________________________

____

____

Name and Address of Elementary School

• Elementary School Enrollment:__________

Section 1: Type and Number of Equipment

_____ 1.1 List the numbers of each type of equipment located on school playgrounds:

_____ Slides

_____ Swing Structures

_____ Merry-Go-Round

_____ See Saws

_____ Suspended Bridge

_____ Balance Beams

_____ Rocking Apparatus

_____ Geodesic Dome Climbers

_____ Monkey Bars

_____ Overhead Ladders

_____ Sand Play Area

_____ Water Play Area

_____ Number of Individually Separated Play Structures

_____ Number of Interconnected Play Structures
_____ Other Types of Equipment

Section 2: Location And Accessibility

Use symbols: √ = Yes X = No

_____ 2.1 Is the play equipment easily in view of nearby residents and/ or passersby?
_____ 2.2 Is there a fence, wall,or shrub at least 3 feet high surrounding the play equipment?
_____ 2.3 Is access up to the play equipment possible for children in wheelchairs by means of a hard surface?
_____ 2.4 Can wheelchairs get up on any of the play equipment?

Section 3: Size and Placement of the Equipment

Use symbols: √ = Yes X = No

_____ 3.1 Is there at least 10 feet of space between each piece of equipment?
_____ 3.2 How many concrete footings around support structures are exposed above ground level?
_____ 3.3 Is all equipment placed so as to avoid collision or interference with traffic patterns of children on wheel toys on hard surface pathways?
_____ 3.4 Is smaller sized play equipment, intended for young children, present?
_____ 3.5 If so, is smaller equipment separated from larger equipment so as to discourage cross over use?

Section 4: Swinging Equipment (If no swings are present proceed to Section 5)

Use symbols: √ = Yes X = No

_____ 4.1 How many swing structures are present?
_____ 4.2 Number of swing seats?
_____ 4.3 How many of the swing seats were made of metal or wood?
_____ 4.4 How many of the swing seats have a swivel type suspension?
_____ 4.5 How many if the swing structures are lower, smaller type swings, which accommodate young children?

_____ 4.6 How many of the swing seats for younger children are on a separate structure from the other swings?

_____ 4.7 How many of the swing structures have barriers such as fences or hedges, which discourage children from running into swings while swings are in motion?

_____ 4.8 How many of the swing structures have support structures for which are firmly anchored in the ground?

_____ 4.9 How many of the swing structures have sharp corners, edges, or projections on any part of the swing seat, chains or swing structure?

_____ 4.10 How many of the swing structures have swings with moving parts in good working condition and not cracked or rusted so as to be in danger of breaking?

_____ 4.11 How many swings have chains covered with plastic or other material so that fingers cannot pass between chair links?

_____ 4.12 Which of the following surface materials is found under the swing?

_____ concrete _____ clay _____ pea gravel
_____ asphalt _____ sand _____ rubber matting
_____ grass _____ mulch _____ other

Section 5: Sliding Equipment (If no slides are present proceed to Section 6)

Use symbols: √ = Yes X = No

_____ 5.1 How many slide structures are present?

_____ 5.2 Are all parts of the equipment not broken and present?

_____ 5.3 How many of the slides have sharp corners, edges or projections?

_____ 5.4 How many of the supporting structures are firmly fixed in the ground?

_____ 5.5 How many of the slides are wide enough to accommodate more than one child sliding side by side at the same time?

_____ 5.6 How many of the siding surfaces are stable, smooth, and even throughout their length?

_____ 5.7 How many of the slides have an angle of the slide which levels off at the bottom to cause deceleration before the child reaches the end of the slide?

_____ 5.8 How many inches high from ground level is the lower end of each slide?

_____ 5.9 How many feet from the ground is the highest point for each slide?

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____

_____ 5.10 Which of the following surface materials is found under the slide?

_____ concrete _____ clay _____ pea gravel
_____ asphalt _____ sand _____ rubber matting
_____ grass _____ mulch _____ other

Section 6: Climbing Equipment (If no climbing equipments are present proceed to Section 7)

Use symbols: √ = Yes X = No

_____ 6.1 How many separate climbing structures are present?

_____ 6.2 How many of the climbing structures have structural supports firmly fixed in the ground?

_____ 6.3 How many of the climbing structures have all parts securely fastened?

_____ 6.4 How many of the climbing structures have open holes at the end of pipes or tubes which could trap hands or fingers?

_____ 6.5 How many of the climbing structures have small spaces where structures connect which could possibly trap hands or fingers.

_____ 6.6 How many of the climbing structures have sharp corners, edges or projections?

_____ 6.7 How many of the climbing strucutures have distances between horizontal climbing levels not less than 7 inches or more than 11 inches?

_____ 6.8 What is the maximum height from the ground that a child can climb on each piece of equipment?

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____

_____ 6.9 How many of the climbing structures have a guard rail around the heighest platform area?

_____ 6.10 Which of the following surface materials is found under the climbing equipment?

_____ concrete _____ clay _____ pea gravel
_____ asphalt _____ sand _____ rubber matting
_____ grass _____ mulch _____ other

Section 7: Rotating Equipment (Merry-Go-Rounds, Swinging Gates...) (If no rotating equipment are present proceed to Section 8)

Use symbols: √ = Yes X = No

_____ 7.1 How many rotating structures are present?
_____ 7.2 How many of the rotating structures have supporting structures firmly fixed in the ground?
_____ 7.3 How many of the rotating structures have all joints and fasteners holding the equipment firmly together?
_____ 7.4 How many of the structures have sharp corners, edges, or projections?
_____ 7.5 How many of the rotating structures have an open space between the center post and the outer perimeter or the rotating structure?
_____ 7.6 How many of the rotating structures have a cleared area extending out 20 feet around the structure, so as to allow running space for children coming off of the merry-go-round?
_____ 7.7 Which of the following surface materials is found under the rotating equipment?

_____ concrete _____ clay _____ pea gravel
_____ asphalt _____ sand _____ rubber matting
_____ grass _____ mulch _____ other

Section 8: Spring Rocking Equipment (Rocket ships, and Animals...) (If no spring rocking equipment are present proceed to Section 9)

Use symbols: √ = Yes X = No

_____ 8.1 How many of the spring rocking structures are present?

_____ 8.2 How many of the spring rocking structures have supports firmly fixed in the ground?

_____ 8.3 How many of the spring rocking structures have all parts of the equipment present?

_____ 8.4 How many of the spring rocking structures have sharp corners, edges, or projections?

_____ 8.5 How many of the spring racking structures have handholds at least 3 inches long?

_____ 8.6 How many of the spring rocking structures have footboards of footrests which extend at least 11 inches out from the base?

_____ 8.7 How many of the spring rocking structures have springs in which fingers or toes can be pinched?

_____ 8.8 Which of the following surface materials is found under the spring rocking equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 9: See Saw Equipment (If no see saw equipment is present proceed to Section 10)

Use symbols: √ = Yes X = No

_____ 9.1 How many see saw structures are present?

_____ 9.2 How many see saws are present?

_____ 9.3 How high are the seats during their highest point of use?

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____

_____ 9.4 How many of the see saw structures are firmly fixed in the ground?

_____ 9.5 How many of the see saw structures have internal moving parts accessible to the fingers of children?

_____ 9.6 How many of the see saw structures have all joints and fastenings secure?

_____ 9.7 How many of the see saw structures have sharp corners, edges, or projections?

_____ 9.8 How many of the see saw structures have made provision for cushioning the impact of the seat striking the ground?

_____ 9.8 How many of the see saw structures have handholds on each end which are at least 3 inches long?

_____ 9.9 Which of the following surface materials is found under the see saw equipment?

_____ concrete
_____ asphalt
_____ grass
_____ clay
_____ sand
_____ mulch
_____ pea gravel
_____ rubber matting
_____ other

Section 10: Designated Sand Play Area (Sand is contained within the area for digging...) **(If a sand area is not present proceed to Section 10)**

Use symbols: √ = Yes **X** = No

_____ 10.1 How many separated sand play areas are present?
_____ 10.2 Is the sand clean and free of debris?
_____ 10.3 Does the sand container drain of water?
_____ 10.4 How many of the sand play areas are elevated or covered to exclude dogs and cats from gaining access?
_____ 10.5 How many benches for adult seating are provided adjacent to the sand play area?

Section 11: Designated Water Play Area (Water is contained within the area) **(If a water area is not present proceed to Section 11)**

Use symbols: √ = Yes **X** = No

_____ 11.1 How many separate water play areas are present?
_____ 11.2 How many of the water play areas are fenced and gated to exclude animals?
_____ 11.3 Is the water clear and free of debris?
_____ 11.4 How many inches deep is the water when filled?

_____ _____ _____
_____ _____

_____ 11.5 How many benches for adult seating are provided adjacent to the water play area?

Section 12: Signs, Trees & Pathways

Use symbols: √ = Yes X = No

_____ 12.1 Are there any signs giving details of where to seek help in case of accident?
_____ 12.2 Are there any signs listing any restrictions or limitations in the use of the equipment?
_____ 12.3 Are there any signs excluding animals from the playground?
_____ 12.4 How many trees are located within the playground equipment area?
_____ 12.5 How many covered structures are present which provide shade?
_____ 12.6 How many drinking fountains are located within the immediate play area?
_____ 12.7 Is their a network of hard surface pathways for wheel toys around or throughout the playground?
_____ 12.8 Are there wooden building blocks available within the play area?
_____ 12.9 Is there a garden area planted by children?